

Manufacturers RECORD

An Exponent of Americanism

ESTABLISHED 1882

BALTIMORE, APRIL 25, 1918

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Unmoved Before the Cross Upon Which Humanity Is Being Crucified.

We can comprehend how the jeering, leering soldiers, standing before the Cross upon which the Son of God was crucified, failed to realize the meaning of that hour, and to understand that He who hung upon the Cross was indeed the very Son of God, and therefore we can see how they could be unmoved even by the physical agonies of the Crucified One, since their hearts had been hardened to human suffering.

We can understand how the Pharisees might have been unmoved by Calvary's awful hour, and how the very disciples themselves did not fully, until long afterwards, grasp the tremendous truths which found expression in the death upon the Cross of the Saviour of mankind.

But we cannot possibly comprehend, even in the slightest degree, how any man or woman, boy or girl, whose mentality is sufficient to keep them out of the insane asylum, can face the terrific, the unspeakable and unvoiceable agonies of the last three and a half years without having their souls bowed with grief and their minds and bodies quickened to concentrate and consecrate their all to saving this country from the possibilities of the fearful agony which threatens us.

As our people stand before the cross of humanity upon which not one but millions of men have died for others, as they see upon a thousand battlefields of Europe men shot to pieces, the rivers choked with the bodies of the dead, with advancing troops marching over the shattered bodies of their comrades who had preceded them; as they see the soldiers of the Allies, and now our soldiers living month after month, and stretching now year after year, in the intolerable trenches, full of mud and rats and sometimes of dead men, continuing to meet the onslaught of the enemy; as they think of the hundreds of millions of mothers and fathers and wives and sweethearts, sons and daughters bereaved with a sorrow which has engulfed the world; as they see millions and millions of men and women and children stretching out their gaunt hands for food, pleading that they may be saved from starvation while millions have died by the wayside of cold and hunger, is it possible for any man or woman in this country to be unmoved by these awful scenes of agony?

Can any soul who thinks on these things disregard the call for conservation of food, for increased production of food, for the building of ships and the doing of all other things which are needed to give victory to our armies and those of the Allies as they battle to save us and civilization?

Can anyone who realizes this situation fail to devote every spare moment to Red Cross and kindred work, and to the utmost limit of ability stand behind our fighting men and behind the Government which they represent?

Surely the people who in this hour are slackers must have reached that stage of degradation, mentally, morally and spiritually, which would seem to justly class them as among those who had committed the unpardonable sin for which even Heaven has no cure.

The men and women who heed not this call, but live unto themselves, who fill their bellies with the glutton's portion, who waste their time or their money on worthless pleasures which add nothing to the nation's strength, who for their own personal profit delay work, or who do not wholesouedly throw into the struggle the fullest measure of their power, are cumberers of the ground, a curse to the nation, a disgrace to all mankind, dishonoring the mothers who gave them birth. Let such men and women, however high or low, however rich or poor, be they capitalists, manufacturers, merchants, farmers, mechanics, day laborers, teachers, preachers, clerks, or whatever be their occupations, be spurned with unutterable loathing and contempt.

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MANUFACTURERS RECORD.

BETHLEHEM STEEL COMPANY

IRON AND STEEL PRODUCTS

GENERAL OFFICES:

SOUTH BETHLEHEM, PA.

VOL. LXXII
WEEK

MANUFACTURER

RICHARD D.
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MANUFACTURERS RECORD

DEVOTED TO THE UPBUILDING OF THE NATION THROUGH THE DEVELOPMENT OF
THE SOUTH AND SOUTHWEST AS THE NATION'S GREATEST MATERIAL ASSET

Trade-Name Registered in the U. S. Patent Office

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WEEKLY.

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A CLARION CALL TO ACTION.

To the Editor of the Transcript:

The people of this country are devoting a vast amount of time, money and thought to the betterment of moral, physical and intellectual conditions in our camps. Books, entertainments, sweaters, "smileage"—all good in their way and proper time; let the boys have all we can give them.

But the crying need of the hour is fierce, determined action in the prosecution of the war on the actual field of battle. For it is day by day more unmistakably our war, not "theirs;" the splendid host of fighters in Picardy is our army; we and the Allies are at last one. God help us to get reinforcements there in time!

What we need today is not smileage, but mileage—3000 miles of it, and then the spirit to do or die. The day of academic theorizing, of mere statistics, of rhetoric is past. Knit brows, tense muscles, fiery enthusiasm and vigor must take their place.

When the brown line of Lancashire lads swings into columns of fours, marching toward the trenches, they are not singing paeans of peace nor dreamy visions of world-wide democracy. Hark!

We've beat 'em on the Marne,
We've beat 'em on the Aisne;
We gave 'em hell at Neuve Chapelle,
And here we are again!

That is the spirit we need, at home and abroad, in the camp and in the White House, if we are to win the war; the spirit that moved Farragut, bound to the mast, to order: "Damn the torpedoes—full speed ahead!" That sounds, does it not, far more like Onset Bay than Washington, where passionate demands for genuine war-like action have too often been met with columns, not of men, but of figures as to the size of the new American buildings at "a certain point in France" or a disquisition on the beauties of the peace of nations safe in their universal democracy.

Oh, for an outburst of splendid, impulsive call to battle, of fiery leadership! The two men to whom we must naturally look for just that are not sulking in their tents, but are authoritatively kept out of the actual business of war.

The land resounds with appeals for hospital supplies, for books, for entertainment equipment—all fine and desirable equipment; but now, for God's sake, give us men, munitions, aeroplanes, ships, guns, and, most of all, inspired self-forgetful, impassioned leadership!

We have timidly patted the mad dog and said: "Good doggie!" so long that it is hard to convince our worn and hard-pressed allies or the dog himself that we are in earnest.

Sound the assembly! Man the trenches, and when the gray-green masses of the enemy appear let us not offer them peace without victory, nor tell them we "thank God we entered the war unprepared," but "give 'em hell!"

WILLIS BOYD ALLEN.

Boston, April 13.

The Struggle Is Unto Death!

EITHER we shall be destroyed, and enslaved America become forever a German colony, ruled with German frightfulness upon all except Germans; or,

Germany will be overwhelmingly defeated, at a cost to us of millions of lives and many billions of money. But the money cost is not worth considering, for all that a man hath will he give for his life and all that a nation has of accumulated wealth it might gladly spend to be saved from death and infinitely worse than death.

Let us not minimize our task, let us not think American bluff or braggadocio will carry us through. If all the mighty power of England and France and Italy and Belgium and Serbia, and for three years Russia's giant armies, availed not to crush the inhuman but fearful fighting machine, we should realize that all that is in us and all that we have must be thrown into the fight with the abandon of a nation which gives its all to the task.

This nation must fight; fight as never before in its history; fight with the utmost power of an awakened, burning, living hatred of the accursed thing we fight; fight not German militarism only, but fight all Germany; fight not to make the world safe for democracy, but fight for infinitely more than democracy—fight for our existence as a nation; fight to save our women and children from the brutish beasts who have saddened millions unto worse than

death; fight unto death the power that, with a hatred infinitely greater than its hatred to Belgium and France, would enslave us; fight, fight and fight with all the enraged, death-defying power of a nation that slumbered long, but which now knows that either it must conquer or it must die.

That is our task. We did not seek it. War was made upon us, and while Germany determined to conquer and rule us we still slept on. But now, thank God! we are awakening. We are not yet fully aroused. There are some millions who are still sleeping, lulled into a false sense of security by the very peace-preaching in the past of our own public men; but we are as a nation awakening and beginning to bestir ourselves.

Well may we pray "Forgive us, O God, that we heard not Thy call; forgive us for our love of ease; forgive us that the pulpit and public men who should have been leaders uttered no clarion call to the dead to awaken ere it be too late. Forgive us that we loved prosperity more than we loved to heed Thy call to duty. And now, O God, quicken us that we may fight; give us the power to fight as Thou didst give to Thy chosen people of old, and help us to strike with the utmost power of the nation, guided by Thy Almighty help, and to know that the harder and more terrific our fight the more surely we will be doing Thy work."

And now let us fight in this spirit. Nothing else will avail us now.

SCHWAB'S APPOINTMENT INDICATIVE OF THE EVOLUTION UNDER WAY IN WASHINGTON.

THE one man of all others in this country who should, at the very beginning of the war, have been at the head of the Shipbuilding Board has now been called to the great task of hastening the building of ships to save civilization.

Charles M. Schwab is an amazing genius, with an amazing power of work and of getting work out of other people. The nation should have turned to him as the first man to be called to this great task. Mr. Hurley is a man of remarkable ability, as is Mr. Plez, but neither of them are shipbuilders, and in expecting them to create an enormous shipping tonnage, hampered by the many adverse conditions under which shipbuilding has labored, was to anticipate more than was humanly possible. They are not supplanted, but Mr. Schwab is brought in through Mr. Hurley's efforts to head the great task with which they have been so vigorously and aggressively identified.

Full credit should be given to Mr. Hurley for his efforts to bring Mr. Schwab into the Shipping Board, for he thus displayed a patriotism which proved that he sought only the best results for the country, regardless of any personal glorification which he might secure by the building of ships. Indeed, Mr. Hurley was big enough to want as his associate and co-laborer the very greatest combined and steel shipbuilding genius in America.

There is hope for America and civilization in the building of ships with the dynamic force of Mr. Schwab driving this work as probably no other man in the country could do, because, while there are other men of tremendous dynamic force they have not had the same experience as Mr. Schwab in the

handling of enormous steel activities, from the management of the Steel Corporation to the creation of the Bethlehem's vast interests, with its immense shipbuilding plants on the Pacific coast, as well as on the Atlantic.

The appointment of Mr. Schwab shows a gradual evolution from the day when incompetent political attorney appointments ruled the shipbuilding activities of the nation, through the Denman-Goethals controversy and from then on from one change to another, progress being made in every move, until we have now reached what is probably the greatest constructive shipbuilding genius who could be called to this task, for he combines a wider experience in iron and steel and shipbuilding than any other man in America.

This evolution in the shipping board is typical of the evolution which is gradually rounding into better shape many other parts of our fighting machine, and is an augury for good for us and an omen of death for Germany's war plans.

We started out in the war apparently with the idea that men of mediocre ability who had never had any experience in creating a war machine could be trusted to measure up to the task for which Germany had been preparing for fifty years or more.

This country preferred peace and prosperity to duty and sacrifice, and we had as a country very nearly sold our soul for peace and prosperity. From the pulpit all the way down through private life our country had been tainted with the accursed propaganda of Germany. We had been taught to believe that our part was to grow enormously rich, rich beyond the dreams of avarice, in grabbing for ourselves the world's trade while England, and France, and Russia, and Italy, and Serbia, and Belgium were being murdered before our eyes. They held out eager hands from millions of starving people

begging for help, and we heeded them not, but reached out eager, grasping, miserly hands to grab every dollar of money which these stricken countries could pour into our coffers for foodstuffs and ammunition, and gave not even moral support in return. And then public men, bankers and newspapers gloated over our supposed ability to go into the world's markets and rob these countries of all the trade upon which their life had depended. We boasted that we were going to become the great banking and trade center of the earth without so much as giving a thought as to what would become of those nations whose soldiers by the millions were dying on the battlefields, who were, indeed, dying in the front-line trenches, to protect this country from Germany's overrunning America.

President Wilson in all the early history of the war, when he talked about fighting German autocracy and not fighting the German people, was voicing what the majority of American people wanted him to say. It is time for the people of this country to realize that they are individually responsible for our unpreparedness, for the death of millions who shall have to die because of this unpreparedness; that they are responsible for the inefficiency that so long ruled in the War Department as in the Shipping Board; that they are responsible for the desire for peace and prosperity instead of duty and sacrifice, and that having brought about these conditions they must bear the burden.

For months before our entrance into the war and after the war began there was almost unbelievable procrastination and inefficiency in the War Department, as in other branches of war work, and because those who knew the facts knew that nothing could be done without letting in the sunlight of public knowledge, hidebound partisans, more interested in parties than in the country, more concerned as to individuals than as to the lives of soldiers, of so narrow a vision as not to be able to comprehend the meaning of this war and our weakness in it, bitterly assailed Senators and Representatives and newspapers who, from a sense of duty, tried to tell a little of the truth. But none of those who criticized these shortcomings ever let the public know the seriousness of the situation and the fearful incompetence that had prevailed.

We are now getting over the brag stage and are settling down to the real job of fighting. The War Department has been completely reorganized. It is an entirely different machine from what it was three months ago. No President and no Secretary of War could have held the public confidence any longer if the actual facts that were known and some of which were brought out had not resulted in the great changes that have taken place in the reshaping of the War Department and putting it on what will be a real fighting basis. And now Mr. Baker can add to the splendid work that Crowell and Stetinius and Goethals and others are doing, the value of the experience gained in Europe.

In the War Department and in the Shipping Board we have had a constant evolution. Change after change has been made for the strengthening of the Government, bringing assurances that though we waited long and wasted nearly a year's time we are now putting at the head of the great constructive war activities the ablest men to be found in America. In this is the hope of the nation and of civilization.

The appointment of Charles M. Schwab is an augury for good, and the millions of people in this country who have followed Schwab's work without knowing him personally will be able to join with his personal friends, to whom he is always known as "Charlie Schwab," and say "God bless Charlie Schwab!" in this the greatest work to which he has ever been called and the work upon which the life of America and civilization may largely depend.

THE COURSE TO PURSUE.

UNLESS a man is aggressively American he is practically pro-German, and every man who is pro-German, even in thought, should be imprisoned at hard labor, and every man in this country who attempts to retard the fight of the United States against Germany should be promptly hung or shot. Drastic work must be the order of the day.

[From Josephus Daniels' News and Observer, Raleigh, N. C.]

SCHWAB CUTS OUT ALL FOOLISHNESS

Figuratively He Grabs Hurley and McAdoo by the Hair Where It's Short.

DISAGREEMENT BETWEEN THEIR BOARDS SETTLED.

For Weeks There Had Been Contention and Dispute Over Steel Deliveries.

(By the Associated Press.)

Washington, April 19.—A disagreement of three weeks' standing between the Shipping Board and the Railroad Administration over steel deliveries was cleared away today at a conference with the War Industries Board called at the request of Chas. M. Schwab, the new director general of shipbuilding.

The foregoing headlines over a Washington dispatch appeared in the April 20 issue of the News and Observer, owned by Secretary of the Navy Daniels. And so, according to this reliable chronicler of events, "foolishness" had ruled the day for three weeks, and it took Schwab's vigorous methods to bring order out of chaos!

We hope Brother Josephus will not fire his headline writer for letting the light of truth into the situation.

PASS THE WORD ALONG.

WE commend to other readers the course of Attorney Hopwood of Columbus, Ohio, in handing to his local newspapers articles in the MANUFACTURERS RECORD which he would like for others to read. Mr. Hopwood is an industrial lawyer at Columbus, and when he finds an appeal to Americanism that arouses his patriotic fervor he takes the article to the newspapers of his city, in order that they may pass the word along to their own circle of readers.

Next to securing subscribers for the MANUFACTURERS RECORD, so that every article of every issue might be before them, it is a useful work to hand articles to local publications for possible use and additional circulation in their respective fields.

An account of Mr. Hopwood's activities is given in a letter, in which he says:

Various articles in your issue of March 21 are very interesting, and I am this day presenting them to the editors of the Columbus Evening Dispatch and the Ohio State Journal. I am sure that they will be glad to use extracts from these articles, giving you due credit. You are issuing a mighty fine publication, which is surely very American, and you deserve lots of credit for your frankness. It is too bad that other publications in this country are not trying to drive home the lesson to the American people as you are endeavoring to do. Keep up the good work!

H. L. Hopwood.

SLACKERS BARRED FROM HELL.

PLACE, Hell. Enter one of Satan's minions from the earth.

"Who comes here?" cries the gatekeeper.

Answer—"Imp No. 1,000,000,000, with a choice spirit who is worthy to enter Hell. He lived in America, and in the war of Germany alias Hell against civilization he was a slacker. He cut short his work, he struck for higher wages, he bought no Liberty bonds, he robbed the people and the Government, he cheated the soldier."

"Enough!" cried the gatekeeper. "He cannot enter here. Hell has no place for anybody who was a slacker on earth, because he would be a slacker down here. Give him a box of matches and let him go and start a new place for the man who sank the Lusitania, for Von Hindenburg, for Kaiser Wilhelm and all their gang. Hell doesn't brag on respectability, but it draws the line on such scoundrels, who outclass anybody we have here."

FOOD WASTAGE A CRIME.

IN a letter to Dr. Soule, Federal Food Administrator of Georgia, Mr. E. H. Griffin of Bainbridge lays much emphasis upon the point suggested in the MANUFACTURERS RECORD last week, that wasteful extravagance of food in private homes and public entertainments should be absolutely cut out. In his letter Mr. Griffin says:

You have asked the co-operation of the press in the work of the Food Administration in this State, and we have given you unbounded support in every way we could, but we must speak plainly. There is a terrible waste of food being made here and elsewhere at social and public gatherings, and as a patriotic citizen I think it is about time that the Administrator issued a manifesto calling upon the people to quit this waste. It makes the prices higher on the poor people, and it is the height of folly for any paper to fight waste of food and at the same time have its columns filled with parties and spreads where worlds of food is wasted.

The position taken by Mr. Griffin is absolutely correct. Waste of food at this time is criminal, whether in private families or in public entertainments or elsewhere.

Wherever a public entertainment is held and a dinner or banquet of any kind is given an example should be set of the most rigid conservation of food. The commercial or business gathering which gives an elaborate entertainment, with food waste, at the present time is co-operating in the largest extent in its power to aid Germany.

The private family which undertakes, by reason of its wealth and its custom of the past, to load its table with unnecessary food for its daily use or for company is a vigorous coworker with Germany.

Food wastage is not only a crime at the present time against the dying, starving millions in Europe who are begging for food, but it is a crime against our soldiers and the soldiers of our allies as they lay down their lives for civilization.

BUILD MORE WOODEN FREIGHT CARS.

THE pressure upon the steel plants or the country for steel for war purposes is so great that it is possible the Government will be compelled to turn largely to lumber for the building of freight cars in place of steel.

The MANUFACTURERS RECORD has been urging this for a year. We have persistently taken the ground that the demands for steel would far exceed the capacity of the existing plants, and that, to as great an extent as possible, lumber should be used in building freight cars. More than a year ago we urged that every big lumber concern in the country should be asked to consider the advisability of building freight cars, and that the entire lumber resources of the country should be mobilized for the building of wooden freight cars wherever this could be done without interference with the shipbuilding program. There are many yards which cannot produce big ship timber, and many of the yards producing ship timber could, at the same time, turn out lumber suitable for freight cars, but not available for ships. Ordinary carpenters, heretofore engaged in house-building and similar work, could, to a large extent, be employed in the building of these wooden cars.

Not a moment should be lost in pressing this campaign of wooden-car building, for it is not possible to build as many wooden cars and steel cars during the next year or two as will be needed to save the country from a still further break-down of railroad facilities, to the hampering of all business and all war activities.

A GOOD EXAMPLE FOR OTHERS.

Monarch Mills,

Union, S. C., April 12.

Editor Manufacturers Record:

Please send us by parcel post, immediately, 1500 copies of Dr. Newell Dwight Hillis' address on German atrocities in leaflet form for distribution among our employees.

Send us your bill for same.

EMSLIE NICHOLSON.
Treasurer.

NEEDED POST OFFICE REFORM--A CALM VIEW OF AN ESSENTIALLY IMPORTANT MATTER.

[New York Journal of Commerce.]

THAT war would multiply the difficulties of the Government was expected; and all its departments have passed through intense strain during the last few months with varying results. The task was unprecedented. In a few instances there have been notable failures, but upon the whole the problem has been successfully attacked, and the war machine promises to soon settle down upon a more efficient basis.

There is one part of the Government machinery, however, which conspicuously fails to improve, and that is the postoffice. Other departments have had their lapses and seemed to have succeeded in pulling themselves together, or at least making a start toward improved service. Not so the postoffice, which has performed its functions with increasing delinquency ever since the present Administration assumed control. It was bad enough before that period; it has been going from bad to worse every year. The complaints are painfully numerous and apply to all classes of mail, letters, newspapers and parcel post alike. The editor of the *Railway Age* recently said: "It has been taking six days for the Postal Department to get the *Railway Age* from the postoffice in New York to our office in Washington. The first-class mail service as well as the local service in Washington have become so unreliable as almost to justify the charge that they have broken down." Such complaints are universal and are not confined to any one section of the country, as the postoffice so well knows, and as the general public, wearied of fruitless complaints, also knows to its detriment.

This paper has had an intimate knowledge of the postoffice service for many years. Never in its experience has the delivery of letter and newspaper mail been so wretchedly slow and unreliable. In this respect the Government has unquestionably broken down, and a large proportion of our population receive their daily newspapers hours and often days later than necessary. This inefficiency is felt the more, because in such disturbed times readers are more anxious to receive their daily papers than in ordinary periods. Complaints are useless. They bring no results. Apparently there is no appeal against the greatest Government monopoly on earth; no competitor from whom to get relief; and not even the ballot can reach the autocrats who rule the postoffice, sheltered behind the Administration from the shrapnel of public criticism.

Another blunder in postoffice policy is the establishment of the zone system of charges on second-class mail. On July 1 this will enforce advances of 100 to 600 per cent., which are out of all proportion to the service performed. The publisher wraps, routes, bags and delivers papers to the mail car, the postoffice performing no service but that of delivery to the buyer or dealer. Express companies carry newspapers much faster and cheaper than the Government to all the larger points. The added charge is one that will be passed on to subscribers, and must affect millions of readers. In the case of the *Journal of Commerce* it will cost \$6 per year additional to each subscriber on the Pacific Coast, and corresponding increases at the shorter distances. Sorting of mail for the various zones will also cause much delay.

The zone system is a tax that will destroy business, impair the spread of intelligence and check that free interchange of information and opinion upon which the well-being and homogeneity of the nation largely depends. Surely it cannot be good public policy to restrict the circulation of publications, which unify the country and create and consolidate public opinion more than any other agency. In this respect we compare unfavorably with Canada, which pursues a much more enlightened course, and during the war reduced postal rates on news-

papers from one-half cent per pound to one-quarter cent per pound to all parts of the British Empire, while we are throttling the free flow of public thought by raising the rate from one cent to six cents in the various zones, or, as already stated, from 100 to 600 per cent.

As a sample of Government in business, the postoffice is a warning that should be heeded. Millions have been wasted on rural delivery without any effort to restrain that particular extravagance; and the parcel post has been imposed upon the Government, often at a loss, and to the general impairment of first and second-class mails. Our Postoffice Department cannot compare with the telephone or telegraph systems, which it seeks to absorb, in either efficiency or cost. It has no intelligent accounting of cost of system or delivery, and these important details have never been officially made known. As a business machine or as a public service organization it is lamentably delinquent, and Congress could very profitably occupy a portion of its time in trying to place this service upon a basis of efficiency and economy. Postoffice reform would be a far better vote winner than baiting and harrying overstrained war officials by political investigations.

THE STEEL CORPORATION SHOULD ENORMOUSLY EXPAND STEELMAKING IN ALABAMA AND OTHER COMPANIES SHOULD DO LIKEWISE.

THE Government is making an appeal to the railroads to use Bessemer steel rails in order to release the open-hearth steel business of the country for war purposes. This is a high tribute to basic or open-hearth steel, and is very important for the South, for while the South does not produce Bessemer steel, it does produce in large quantities the highest grade of open-hearth steel. This effort of the Government to secure a larger output of open-hearth steel should stimulate to the utmost the expansion of the steel industry of the South, whose ores are so admirably suited for open-hearth work.

While the Steel Corporation is spending about \$20,000,000 in enlargement of its steel operations at Birmingham, it has not yet begun to touch in that field the magnitude of the expansion work which it should do in the interest of the nation. We believe that it is incumbent on the Steel Corporation to double, and possibly treble, the expenditure which it is now making in the Alabama district for the enlargement of its output of steel. In that State it controls a larger body of ore and of coal in close proximity than any other similar property in the world. It has, therefore, a grave responsibility to the nation and to civilization as trustee for this vast holding of raw materials.

Several years ago we pressed this point vigorously upon Judge Gary and the other directors of the Steel Corporation, and we believe that these efforts were in part responsible for the present enlargement at Fairfield of the plant of the Tennessee Coal, Iron & Railway Co. at an outlay of about \$20,000,000. But we said then that the Steel Corporation owed it to the nation and to civilization to spend \$100,000,000 in the development of its Alabama properties. We repeat that statement with all the emphasis in our power, and we urge the Steel Corporation to give due heed to the suggestion.

But there are other companies besides the Steel Corporation which should take up the manufacture

of steel in the South. One of them is Mr. Schwab's company, the Bethlehem; another is the Midvale, another is the Senet Solvay, and there are possibly other companies whose vast resources and whose responsibility in this crisis fully justify them in making a big investment in steel operations in the South for the good of the nation as well as for their individual profit.

NO CUT-RATE COAL PRICES FOR RAILROADS ON A BRIBERY BASIS.

THE plan of the Director-General of Railroads by which the railroads were authorized to make contracts with coal companies so that every company which would give to the railroads a cut price on coal would be furnished 100 per cent. of its requirements for cars was without the shadow of justification. It was bad business from every point of view. It was establishing as a precedent a cutting of prices for the benefit of special consumers, and giving to these coal companies a bribery of a full supply of cars, while other coal companies, which honestly refused to enter into such a contest, were deprived of cars.

We marvel that any business man should ever have been responsible for causing the railroads to make such a proposition to the coal companies, and it is gratifying that President Wilson, according to public reports, has taken the side of Dr. Garfield in opposing this wholly iniquitous system, and for his opposition to it Dr. Garfield is entitled to credit, and the men who, under Director-General McAdoo, were responsible for this proposed system certainly displayed great lack of judgment in a matter of such vital importance to the ethics of business and to securing the best results from coal production and transportation interests.

DOES NOT LIKE OUR WAY.

"FOR God's Sake, Hurry Up" is the hysterical cry of a publication which seems to have been much interested from the start in showing how much better it knew things than does the Administration.—Radford (Va.) News.

Well, the Administration now believes in preparedness; it now believes that we are not too proud to fight; it now believes in victory before peace; it now believes in a completely reorganized War Department, in a reorganized Shipping Board, and there are yet other changes to come.

We are rather glad to note this enthusiastic endorsement by President Wilson's actions of nearly everything for which the *MANUFACTURERS RECORD* has for three years contended.

What's the matter with the Radford News? Is it wholeheartedly American and pro-British, or is something in the background?

HOW TO TREAT PRO-GERMANS.

THE time is coming when German sympathizers will be run out of every community where they are known. If they are wise, they will either shut up their mouths or leave for Germany.—Dalton (Ga.) Citizen.

Leave for Germany?—not much! That is the last place to which they want to go; you might as well suggest that they leave for the lower regions as to suggest their voluntary return to Germany. We have no ships to spare to forcibly ship them back, and so the next best thing is to intern—or inter—every pro-German, or make them work on the highways for a living.

If they are German spies, then the thing to do is to shoot them.

It is time to make real aggressive war upon our enemies at home as well as upon our enemies abroad.

AN INDICTMENT AGAINST THE GREAT PRUSSIAN CRIMINAL

GERMANY is the only country in the world that openly advocates war as a thing that is good in itself.

Germany is the only country in the world that openly proclaims that plunder is the chief end of nations.

It is the only country in the world that proclaims a divine mission to make war upon the rest of the world.

It is the only country in the world that proclaims that "God is dead."

It is the only country in the world that declares that morals are a delusion.

It is the only country in the world that advocates murder, robbery, deceit and treachery. It is the only country in the world that proclaims these things as national virtues.

It is the only country in the world that murders the wounded, bombs hospitals, sinks hospital ships and shoots Red Cross workers.

It is the only country in the world that poisons wells and spreads disease germs.

It is the only country in the world that murders babies and strikes medals to commemorate the event.

It is the only country that shells unfortified towns.

It is the only country in the world that deports and enslaves civilian populations.

It is the only country in the world that advocates the extermination of weak peoples.

It is the only country in the world that scoffs at international law.

It is the only country in the world that disregards the rules of civilized warfare.

It is the only country in the world whose people act like beasts and glory in it.

It is the only country in the world that openly proclaims the law of the jungle.

All these things Germany does, not casually and by the way, but coldly, deliberately and designedly, and proclaims them as the high and highest culmination of civilization and the final bloom and flower of human culture.

Under this grotesque rodomontade is simply the motive of the common thief. The motive is as old as the world. The philosophy itself is not very novel, although it has been given a modern "scientific" setting. It is expressed in terms of biology. "Everywhere in nature the strong devour the weak," hence "war gives a biologically just decision." "In the jungle force, fraud, cruelty and deceit are virtues. By these the animals live. Man is an animal. Hence —"

In a word, back to the jungle!

These principles are proclaimed by Germany's writers, teachers and preachers, and they are incarnate in the person of Wilhelm.

All this unparalleled cataclysm of horror and death brought on the world by Germany is at bottom simply the criminal instinct of the porch climber and gunman.

The foregoing from the New York Sun is signed "American" and dated at Doby Walls, Okla. It is a splendid summing up of Germany exactly as Germany is and exactly according to its teachings as voiced by its leaders in education, its philosophers and its military machine.

Germany has placed itself entirely outside of all the laws of morality, of honor, of integrity, of civilization which have ruled the world for a thousand years or more and which since creation have been the laws of all the advanced and civilized countries. Germany has definitely sought to rob, plunder, murder, enslave and outrage in order to increase its wealth and power. No mad dog tearing at the helpless child, no wild murderer running amuck through the streets shooting all in sight, ever deserved "elimination and extermination" more thoroughly than does Germany. Pity or sympathy or maudlin sentiment to save Germany from eventual overwhelming defeat would be on a par with turning the mad dog loose to bite other children or turning the rapist loose to destroy other women.

IRON COMPANIES SHOULD, FOR THE NATION'S SAFETY, PRODUCE POTASH AS A BY-PRODUCT.

THE success of potash production as a by-product in cement-making has been so thoroughly demonstrated by the Security Cement & Lime Co. of Hagerstown, Md., the first cement concern this side of California to undertake this work, that other cement companies have installed and still others are preparing to install potash recovery processes. An interesting story of what the Security Company has accomplished is given in this issue. But we can secure from cement production only a very small proportion of the potash needed for the country.

It is well known that potash can be recovered as a by-product in iron production, and the Bethlehem Steel Co. has long been doing this on a limited scale.

The need of potash is so great that it is incumbent upon every iron concern in the country which finds any potash in its raw materials to establish at least at one of its furnaces as a test plant a system for the recovery of potash.

There is no iron or steel concern in the country of large producing capacity which could not afford to introduce at one of its furnaces a potash-recovering plant, not merely for the profit that may be made out of its operation, but as a contribution to the nation's existence through the increased production of food. If the iron companies do not do this of their own accord at a time when their profits abundantly justify the expenditure of a sufficient amount of money to test the plan, then it would seem incumbent upon the Government to compel the leading concerns to thoroughly test by-product potash production in connection with their work.

Every iron property in the country should be thoroughly examined as to the potash content of its ore. We have often published the statement that so far as known some of the iron ores in Eastern Alabama carry a larger percentage of potash than any other ores contain, but this may be due to the fact that other ores may not have been thoroughly analyzed for potash. It is well known that many ores carry an appreciable amount of potash, and some may carry a considerable quantity. Wherever potash can be found in ores to an extent sufficient to justify the production of potash as a by-product, without regard to the actual profit on that part of the business, the company owning or controlling these ores or able to secure them should as a measure of safety for the nation make a complete investigation in regard to the introduction of a by-product potash plant.

The growing scarcity of food in this country demands the utmost output of potash which can be secured, regardless of whether the industry making the potash as a by-product secures an actual profit on the potash or not.

The cement company which had the courage to make a large investment when potash as a by-product through the Cottrell system was an experiment, and had never been tried except by one plant in California, has found the potash part of its business exceedingly profitable. The very fact that it is producing potash insures the uttermost co-operation of the Government in providing transportation for all of the product of the plant. This is a phase of the situation which should be given close attention by other cement companies and by iron concerns.

As it has been fully demonstrated that potash production is a success in connection with Portland cement making, the iron concerns must be equally energetic and broad-minded in spending money to test the ability of their ores for potash as a by-product, and this must be done as a contribution to the nation's life, whether the concern doing it can at the start see much chance for profit or not.

Every pound of potash available in iron ores which is now wasted is an economic loss of tremendous importance to the country.

FURNISHING AMMUNITION TO SAVE AMERICA FROM DESTRUCTION.

Gilkey, N. C., April 13.

Editor Manufacturers Record:

Enclosed you will find check for \$5, for which please send the MANUFACTURERS RECORD one year to Gilkey Mercantile Co., Gilkey, N. C. The writer is a member of this firm, and in talking with Mr. Killian, the manager, this morning we decided that it would be a good thing to subscribe for the MANUFACTURERS RECORD and just leave it lying in a conspicuous place in the store where the public would have access to it and thus get some of the good things with which it is filled every week.

I believe that this will produce larger results than the investment of a similar amount in War Savings Stamps, because it will no doubt be the means of bringing many indifferent ones to a sense of their duty and bring about the sale of many War Savings Stamps.

C. F. CLINE.

The suggestion of Mr. Cline is a good one. If we could get the MANUFACTURERS RECORD into every country store and into the hands of every preacher, county or city, we believe that a vast amount of indifference would be quickly supplanted by enthusiastic, aggressive Americanism.

Are we not justified in asking every reader who believes as Mr. Cline does to follow his example, and add at least one more subscription to our list?

Let us say with all possible emphasis that we are not moved by selfish reasons in making this suggestion. He who permits business or selfish interests to influence his actions now is a disgrace to his country.

We gladly give to our exchanges, to our readers, and all others, free permission to republish in news or editorial columns, in leaflets or in advertisements, everything on the war which appears in the MANUFACTURERS RECORD. Nothing that we publish is copyrighted. All that appears in our columns can be used with simply the usual credit, with utmost freedom.

We are glad to do this as some little brain contribution, we hope, toward winning the war, for whatever is written on that subject is from a deep soul-sense of the tremendous responsibility which rests upon us as upon every other American to do our utmost. That is the only excuse for publishing this and the following letters:

American-Press,

Lake Charles, La., April 11.

Editor Manufacturers Record:

The work you are doing in behalf of human liberty in this fearful world cataclysm is monumental. It is an amazing pity that every newspaper in the United States has not the courage that your splendid publication has to come out in the open and call things by their right names. To me your work is an inspiration and leads me to believe that human liberty and the desire for free government still abides on the earth, and must be triumphant by and by, even though it shall pass through deep tribulation.

HENRY C. FULLER, Editor.

First National Bank,

Spartanburg, S. C., April 10.

Editor Manufacturers Record:

I want to thank you from my heart for your letter of the 9th, enclosing one of D. Stewart Webb to you. We have from Mr. Webb a personal letter and a copy of the advertisement that he used. We are very grateful to the sympathetic chord that you are fighting so earnestly on coming in touch with our business life with such force that it compels us to use of our means in scattering it broadcast in our community, but never did we dream of the echo that it has achieved through the splendid and generous publicity you retaliated with.

Keep up your good work, and in our way we will endeavor to do ours.

Tell your editor to hit the farmers. They are not doing their part, and everybody on earth seems scared of them.

A. M. CHREITZBERG, President.

We fully realize that the farmers are not doing their part, and we have repeatedly urged that the Government should keep up a regular, systematic campaign, month after month, from every postoffice in the United States, especially in the small towns and country districts.

Republic Oil & Sulphur Co.,

New Orleans, La., April 10.

Editor Manufacturers Record:

I am herewith enclosing subscription to your most valued paper. It is as essential to pay you this amount as it is to buy Liberty bonds, for you are, in my opinion, furnishing the most powerful "ammunition" of any of the manufacturers of America to kill the Germans and bring death to their cause. Don't let up.

S. B. FORMAN.

To kill Germans ere they kill all our loved ones is our task now, and we gladly furnish the best ammunition to that end which we can produce.

NO COMPROMISE.

Poem delivered at a banquet to Major Edouard Dupont of France at Charlotte, N. C., on April 13.

What? Compromise now? When the poisoned sword

Still seeks for blood and spoil?

Halt now? When the foot of the heathen horde

Yet stands on freemen's soil?

Have we lost the zeal of that ringing note

Which marked our heroes' might?

Our reply is a rush at the tyrant's throat:

"We have only started to fight!"

As long as the memory of Bunker Hill

Shall cause our souls to start;

While Saratoga brings its thrill

To every patriot heart;

Until the visions of Valley Forge

Have faded from our eyes—

We'll answer the blear-eyed battle lords:

"We seek no compromise."

As long as the name of Lafayette

Is one that we sanctify

With the truth that France is bleeding yet

For the light we lift on high,

We'll hurl our line in the vandal's way

Till the last mad rush is stayed;

Till the jury of all the earth shall say:

"Your debt to France is paid."

As long as mother's name is dear

To our hearts, where'er we roam;

As long as the tender thoughts that cheer

Are memories of home,

Where Love is waiting, as yet secure,

With eager, tearlit eyes;

We send our answer, strong and sure:

"We want no compromise."

As long as the God of nations rules

The destinies of power,

And wrecks the plans of plotting fools,

Who plunder for an hour,

We'll battle on in holy might,

And strike with Canaan's brawn,

For we know that out of the death-filled night

Victory will come with the dawn.

While an iron shark scours the open sea,

And the law of lands is naught,

There can be no peace in the hearts of the free,

No healing respite bought;

We'll fight till the King of Hate must bow;

We'll throttle the Teuton lies;

Until that day—the world must know—

"We make no compromise."

—Private Verlin Harrold.

Base Hospital, Camp Greene, N. C.

IS WOODEN SHIPBUILDING PROGRAM TO BE CURTAILED?

Washington Dispatches Bring Protest from Southern Pine Association—National Type of Boat Adopted.

New Orleans, La., April 18.—[Special].—"Curtailed" of the nation's wooden shipbuilding program at this time is inconceivable.

This declaration was made here today by John H. Kirby, Government Lumber Administrator for the South, when shown Washington press dispatches saying that all engines and boilers the country can produce are needed for steel ships, and that, because of this scarcity of motive power equipment, future wood ship contracts would have to be limited.

While lacking definite information such as would permit him to make positive denial of the Washington stories, Mr. Kirby asserted everything indicated, and he had been so informed, that all wooden ships which can be constructed are to be built as long as the scarcity of ocean tonnage and the submarine menace continue.

"There isn't in my mind any probability of a curtailment of wooden ship construction," said the Lumber Administrator.

"The wooden ship, for centuries carrier of the earth's maritime commerce, is today a life-saver in the world's greatest crisis. Nature endowed America with a wealth of magnificent forest growth. Shall we neglect to use one of our great resources at this vital time when all our strength must be put forth in a supreme struggle?

A nation that can build ships can certainly build engines to go in those ships."

The Washington dispatches were received in business circles here with general incredulity. It was pointed out that only a few days ago a contract for 12 new wooden ships was awarded an Atlantic coast yard by the Emergency Fleet Corporation.

By some it was considered very strange that the Government was planning the expenditure of \$50,000,000 on concrete ships, an untried experiment, when it could not provide machinery for wooden vessels, the construction and operation of which was a demonstrated success. Concrete ships require fully as much or more machinery than wooden vessels of similar tonnage.

It was pointed out also that if power equipment was so scarce the Fleet Corporation itself, with millions at its disposal, could easily put in its own shops and build engines as the navy had done.

Not a few commentators were inclined to attribute the whole matter to a revival of the hostile propaganda work such as the wooden ship program encountered during its early stages.

While the public was expressing confidence that nothing would be allowed to interfere with wooden ship construction, private advices from Washington were being received here by the Southern Pine Association indicating that the Emergency Fleet Corporation is already looking ahead to the building of more wooden ships.

Abandonment of the Ferris model and substitution of a modified Daugherty type for all future wooden ship construction in Gulf and Atlantic yards has been decided on by the Fleet Corporation, according to the news from Washington. Marine architects of the corporation are said to be now making final draft of plans and specifications for the modified ship, which will be officially known as the National ship. The name National comes from the fact that the Daugherty vessels were first constructed at the plant of the National Shipbuilding Co., Orange, Tex.

The American Bureau of Shipping is reported to have approved the new ship, and as soon as yards are able to take on additional contracts, or more yards are established, actual construction of these vessels will begin on an extensive scale.

One important advantage claimed for the National ship over the Ferris model is the fact that its cargo-carrying capacity is much greater, the net deadweight tonnage being 4700, whereas the Ferris ship is of but 3500 tons.

The National vessels can also be constructed more rapidly and will be of the laminated type, that is, constructed of "built-up" timbers. This will eliminate the factor of the extra large size timbers required for the Ferris ship, which Southern pine mills have experienced so much difficulty in procuring, and will make it possible to keep shipyards constantly supplied with all material needed at all times. Lumbermen and shipbuilders have long contended that the timber specifications of the Ferris ship were unnecessarily severe, and that as good or better vessels could be built of smaller timbers, such as are more readily procurable from Southern forests.

The Daugherty or National ship sprang into fame with the launching of the War Mystery at Orange, Tex., February 27. This was the largest wooden steamer ever built, and declared by Lloyds the finest possible type of wooden ship. She was given a rating of 100 A-1. Before approving the type for the Fleet Corporation, however, the American Bureau of Shipping insisted on certain changes in design. The National ship will have diagonal planking both inside and out, not merely on the outside, as in the original Daugherty vessel. Double flooring is also called for, and a number of minor alterations made.

A. A. Daugherty, general manager of the National Shipbuilding Co., was in Washington at the conference with the Fleet Corporation officials and the American Bureau of Shipping when the Government finally adopted his type of ship.

When Edward L. Hurley, chairman of the Shipping Board, offered Mr. Daugherty \$50,000 for his plans, the latter flatly told him they were not for sale.

"But, Mr. Daugherty," protested the chairman, "that is a very fair price, and besides, you should consider other things besides your own personal interests. You have something that the country needs very badly in this crisis. As a patriotic American, you should accede to our offer of \$50,000."

"I said the plans were not for sale," rejoined Mr. Daugherty. "The Government can have them for nothing."

Steel Shipyard for Wilmington.

Fabricated steel ships will be constructed at Wilmington, N. C., by the Carolina Shipbuilding Co., which is a subsidiary of the George A. Fuller Company of New York, with general manager Ralph Starrett in charge of the shipyard to be established at Wilmington. The plant will include six ways and the initial output will be fabricated steel ships of the Isherwood type, of 9000 tons burden, having an hourly speed of 11 knots. These vessels are understood to be constructed of more standard plates than any other type of fabricated steel ships, thus facilitating the work of building and completing them in less time than possible heretofore with steel steamships.

The complete plans for building Isherwood ships, valued at \$20,000, have been presented to the United States by the United States Steel Corporation, which declined to sell them to the Government. Contract for building 18 of these vessels has been awarded to the Carolina Shipbuilding Co. by the Government, and all are to be completed during 1919.

\$40,000,000 Worth of Shipbuilding at Savannah

Savannah, Ga., April 20.—[Special].—Savannah's total shipbuilding figures now aggregate more than \$40,000,000, according to the latest statistics from the Board of Trade. The Terry Shipbuilding Corporation in the last two weeks has secured contracts from the United States Government for the construction of 10 steel tank steamers at \$1,000,000 apiece, and two Government floating drydocks at \$1,000,000 apiece. This is a total of \$23,000,000 for the Terry interests, as they had previous contracts amounting to \$5,000,000. The total for Savannah is now as follows: Terry, \$23,000,000; Foundation Shipbuilding Co., \$12,000,000; National Shipbuilding Co., \$3,000,000; Savannah Engineering Co., \$1,500,000; Georgia Shipbuilding Co., \$1,000,000—making a total of \$40,500,000.

To Build Ships for France.

Tugs and barges costing \$5,000,000 will be constructed at Fernandina, Fla., in a shipyard which R. C. Camp and associates will build. They have been ordered by the French Government, and the Fernandina plant will be provided with 10 ways, the investment to approximate \$1,000,000 for the yard and its equipment of machinery.

The French contract calls for 12 ocean-going tugs and 12 large barges, and to fulfil it the yard will employ 3000 men. Those interested with R. C. Camp are John A. Ryan, James T. Farrington, William H. Wallis and A. W. Knowles. Negotiations are now pending for several other large contracts which are expected to employ this new Fernandina shipyard for the next five years.

Additional Marine Ways for Tampa.

In accordance with a Government contract, the Tampa (Fla.) Dock Co. will build marine ways for handling ships up to 5000 tons, and the cost of this addition to the company's facilities will approximate \$250,000. Plans and specifications are being prepared with a view to beginning construction, so that the ways can be completed within four months. Considerable machinery will be installed in this connection, and it is understood that the company has practically agreed upon contracts for this new additional mechanical equipment. Both steel and wood ships are being constructed by the Tampa Dock Co., whose large Government contracts have heretofore been detailed.

For Building Wooden Barges.

The Foundation Company of New York has merged the Carpenter-Watkins Company of Brunswick, Ga., and will continue the Brunswick shipyard under the title of The Foundation Company, Carpenter & Watkins, Inc. This plant has six ways, and it will be enlarged to facilitate the construction of 200 wooden barges 110 feet long, for which the company has a Government contract. Foster L. Hawkins, an experienced shipbuilder, will have charge of the Brunswick plant, and 1000 men will soon be employed.

Shipbuilding Notes.

The Foundation Company of New York has merged the Reid Shipbuilding Co. of Chicago and contemplates establishing a Louisville (Ky.) shipyard for constructing river craft.

Clay Products to Be Curtailed by Fuel Administration.

Washington, D. C., April 23.—[Special.]—A curtailment of the manufacture of clay products is the first action taken by the Fuel Administration in its program for a general reduction in the output of the building material industries. Since the building operations have fallen off to a marked degree throughout the country, the Fuel Administration and the War Industries Board have held that the manufacture of materials might properly be classified as among the less essential industries.

As a result of the investigation which accordingly was begun with a view to conserving fuel and transportation and converting plants to war work, it has been decided that the clay products could most readily be curtailed. The amount of the reduction has been based upon the average output of the past three years, and the figures which have been reached are assumed to represent rates of production that will serve the best interests of the necessary Government work and in general the interests of the manufacturers involved.

The restrictions decreed by the Fuel Administration were 50 per cent. on face brick, common brick, paving brick, terra-cotta, roofing tile, floor and wall tile, sanitary ware and enameled ware; 25 per cent. on hollow tile, drain tile and sewer pipe, and 15 per cent. on all stonewares except chemical.

In general, the minimum basis of running for the year has been established, taking into account the more necessary requirements outside of strictly war activities, as well as the necessities of the Government. Beyond this it is arranged that whenever the requirements of Government departments for any of the clay products mentioned are in excess of the productive capacity of a given district on the minimum basis, the Fuel Administration will permit an additional output.

Equal treatment for all plants is to be provided wherever possible, according to the Fuel Administration, but allowance will be made for recognizing individual instances where an abundance of fuel and an absence of congestion make it desirable that a large proportion of production be permitted in a given district.

The experience of the past year has established two facts which the Fuel Administration officials declare are undeniable. First, that as far as possible the new war work must be put into old factories to take the place of less essential production. This method of producing war supplies prevents building problems, housing problems and transportation problems which necessarily follow the setting up of new plants for war production.

Second, that in addition to this transference it will be necessary for many industries to make deliberate sacrifices of a part of their ordinary business in order that there may be transportation, men and materials enough for war production.

With these aims in view, it is anticipated that still further reductions in the building material industries will be made when the Fuel Administration has completed its investigation.

Government Report on Coal and Coke Production.

Production of bituminous coal increased 1,600,000 net tons, or over 17 per cent., during week ended April 13, compared with the preceding week, according to the report of the Geological Survey dated April 20. The total production of bituminous coal (including lignite and coal made into coke) is estimated at 10,947,000 net tons, an average production per working day of 1,824,000 net tons, compared with an average of 1,777,000 tons for the past year and 1,680,000 tons in April, 1917.

Production for the first two weeks of April is estimated at 20,264,000 net tons, approximately 19 per cent. below the production of the same period of March, 1918.

The total production of beehive coke is estimated on the basis of railroad shipments at 672,000 net tons, an average per working day of 112,000 net tons compared with 103,000 for the week previous.

Anthracoite shipments rose from 32,223 cars last week to 37,760, an increase of over 17 per cent.

The decrease in coal production in the week ended April 6 compared with March 30 was 14 per cent., whereas the per cent. of full-time capacity recorded shows a decrease of less than 5 per cent. A study of the detailed report shows, however, that the actual decrease in capacity in the week of April 6 measured in tons was nearly 10 per cent. greater than is indicated,

and that the difference is due to a decrease in man hours worked. That is, because of miners' holidays and Liberty Loan Day the mines generally worked short-handed in the week ended April 6, with the result that mine capacity calculated on the basis of mine hours was 10 per cent. lower than normal. The exceptional loss of production in the week of April 6 is, therefore, to be attributed to labor shortage rather than car shortage in all fields reported, with the particular exception of Ohio and New River districts.

The reports of conditions in the Connellsville and adjacent coke regions for the week ended April 13 show slight improvement. Sixty-eight of the principal operators in the Connellsville, Greensburg and Latrobe districts reported production of 311,080 net tons, or 67.8 per cent. of their full-time capacity. Labor conditions improved, losses due thereto decreased from 15.4 per cent. last week to 13.17 per cent. Less coke cars were available than during the preceding week, losses due thereto amounting to 13.9 per cent. compared with 12.8 per cent.

The same operators produced 162,300 net tons of coal. Performance of by-product coke operators during week ended April 13 slightly exceeded that of week of April 6. The ratio of production to maximum capacity rose from 87.5 per cent. during the preceding week to 87.9 per cent.

Out of 12.1 per cent. of maximum capacity which the by-product plants of the country failed to realize in actual output, 5.5 per cent. was lost through lack of coal; 0.5 per cent. because of labor trouble; 5.2 per cent. on account of repairs to plant; 0.3 per cent. due to no market, and 0.6 per cent. for all other causes.

Operating conditions in the several States varied but little during the week ended April 13. Kentucky was the only State to record a material increase. Maryland production of 100 per cent. week ended April 6 decreased to 98.8 per cent. during the past week.

Sloss-Sheffield's Excellent Report.

President J. W. McQueen, of the Sloss-Sheffield Steel & Iron Co., Birmingham, Ala., in the annual report just issued, states that the present outlook seems to be favorable and that there should be a good business during 1918. The report covers 13 months from the beginning of December, 1916, to December 31, 1917, this being due to the change of the company's year, which formerly ended November 30, to conform to the calendar year. It is noted by the president that 1917 was a year presenting extreme difficulties in operations. Interruptions in transportation rendered it impossible for the company to ship large quantities of pig-iron on hand that was sold and was urgently demanded by the purchasers. There were also other conditions affecting operations markedly.

No large fixed improvements to the properties were undertaken, the company limiting its expenditures to efficiently maintaining them and to such improvements, etc., as were deemed essential to maintain the output of the mines and the furnaces now developed and operating. Thus all of the blast furnaces and the developed mines were, notwithstanding traffic interruptions and other adverse conditions, in effective operation and are now in full operation, producing their maximum output possible under the present state of development of the properties and the plants. It is observed, however, that costs of production will increase, owing to labor and material conditions; also that the demand for pig-iron exceeds the supply. Sales are being made at the Government fixed price.

The profit and loss statement shows total operating profits of \$3,370,614.12, of which amount there was left (after deducting bond interest of \$227,500, depreciation and depletion charges of \$665,741.36 and provision for income, war and excess profits taxes estimated \$325,000) the sum of \$2,152,372.76. Out of this there was paid quarterly dividends of 1¼ per cent. each on preferred stock, \$573,881, and dividend of 1½ per cent. on the common stock, \$148,868.67, leaving a balance carried forward of \$1,429,623.09. Total balance to profit and loss after adjustments relating to prior periods, \$5,741,313.76.

The balance-sheet shows total assets of \$27,844,353.56, which includes the permanent investment in plant, machinery, equipment, mineral reserves, undeveloped lands, etc., less allowances for depreciation, depletion, etc., at \$23,886,752.11. It is observed that the appraisal, made by experts not connected with the company, is conservative.

March Receipts of Cattle and Hogs at Stockyards Show Increases Over Those of Year Ago.

Receipts of cattle and hogs at stockyards during March of this year were greater than receipts in March, 1917, according to the monthly stockyards report issued by the Bureau of Markets, United States Department of Agriculture. Receipts of cattle and hogs for the first three months of 1918 exceed receipts for the same period in 1917.

March receipts at 56 yards were: Cattle, 1918, 1,688,029; 1917, 1,324,995; hogs, 1918, 4,372,136; 1917, 3,367,588; sheep, 1918, 1,223,120; 1917, 1,232,543.

Shipments of cattle, hogs and sheep from stockyards all showed increases during March, 1918, over March, 1917, and the first three months' total for cattle and hogs was greater in 1918 than in 1917. Total shipments for March, 1918, were: Cattle, 642,910; hogs, 1,707,170; sheep, 552,397. The March, 1917, figures were: Cattle, 469,187; hogs, 1,151,787; sheep, 439,840. Stocker and feeder shipments as a class, included in above figures, also showed increase in March, 1918, over March, 1917.

More cattle and hogs were slaughtered at 45 cities in March, 1918, than in March, 1917. The figures, giving 1918 totals first, were: Cattle, 997,115, 810,507; hogs, 2,625,400, 2,220,476; sheep, 653,783, 782,552.

Increased receipts and shipments of horses and mules at 43 cities are shown by the report, the March figures, with 1918 given first, were: Receipts, 117,768, 109,108; shipments, 114,076, 107,109.

Another Big Nitrate Plant.

Approximately \$2,000,000 will be the cost of a nitrate plant which the Aluminum Company of America, main offices at Pittsburgh, Pa., will build near Maryville, Tenn. This factory is to produce nitrate as a by-product of the company's big aluminum works and hydro-electric development. It will cover a site of seven acres and will be driven by electric power transmitted from the new Aluminum hydro-electric plant at Alcoa, where a dam is being constructed at a cost of \$100,000 on the Little Tennessee River 50 miles from Knoxville.

Plans and specifications are being prepared and the nitrate plant is expected to be completed by September 1, by which time the Alcoa plant will be generating electricity. The plant buildings will be of brick, cement and steel, of fireproof construction.

It is understood that the Government has contracted for this plant's production of nitrate for use in the manufacture of explosives in the \$100,000,000 works it is building at Hadley's Bend, near Nashville.

To Build Big Oil Refinery.

From 2,000,000 to 3,000,000 barrels of oil will be the daily capacity of a refinery which the C. S. C. Oil & Refining Co. will build in the Stephens county oil field near Ringling, Okla., where the corporation has 920 acres of oil land. This enterprise was recently mentioned as incorporated with \$1,500,000 capital, and it has organized with these officers: President, J. J. Cloughley, president of the First National Bank of Ringling; vice-president and general manager, Claude Bell; secretary and treasurer, R. W. Adams; both of Wirt, Okla.

The Cotton Movement.

In his report of April 19 Col. Henry G. Hester, secretary of the New Orleans Cotton Exchange, shows that the amount of cotton brought into sight during 262 days of the season was 11,501,031 bales, a decrease under the same period last year of 1,040,784 bales. The exports were 3,442,775 bales, a decrease of 1,140,617 bales. The takings were, by Northern spinners, 2,064,422 bales, a decrease of 345,544 bales; by Southern spinners, 3,545,078 bales, a decrease of 78,387 bales.

Drainage Conference Postponed.

The proposed drainage conference, called to meet in St. Louis April 23 and 24, to aid in demonstrating to the Government and to the people of the world how there could be made productive in 1918 and 1919 millions of acres of arable land now uncultivated on account of overflow or too wet conditions, has been postponed indefinitely, according to announcement from the secretary of the Levee and Drainage Contractors' Association, St. Louis.

THE SOUTH AS A SITUS FOR ELECTROCHEMICAL INDUSTRIES

AND

The Influence of Electrochemistry upon the Industrial Life of the Nation

Published in connection with the Southern Tour
American Electrochemical Society April 29 - May 5.

THE American Electrochemical Society will leave Washington April 28 for a tour of one week through the Appalachian South. The points to be visited are included in the order named: Johnson City and Kingsport district, April 29; Knoxville district, April 30; Chattanooga and vicinity, May 1; Sheffield and Muscle Shoals, May 2; Birmingham district, May 3; Anniston, May 4.

This society numbers in its membership the leading experts who have made possible America's supreme position in electrochemistry and electrometallurgy. This supremacy has been secured through developments largely centering around Niagara Falls, but future expansion there has become practically impossible, because nearly all of the power available at that point has been taken up. Consequently, new locations have been sought to meet the requirements of these rapidly expanding industries. Some of them have gone to Canada, and even to Norway, to secure the necessary hydro-electric power, and if this continues it will inevitably threaten America's supreme position in these industries.

At the last National Exposition of Chemical Industries the attention of a large number of electrochemists was directed toward the Appalachian South through the various exhibits of Southern railroads. They were so impressed with the possibilities in the South as a future situs for these industries that they determined to make their spring meeting in the nature of a tour through the Appalachian South to view the situation at first hand.

The MANUFACTURERS RECORD recognizes the great significance of this tour, and believes it to be one of the most important meetings that has ever been brought to the South.

In order to place before the members of this society some facts dealing with the resources and advantages of the Appalachian South as an ideal situs for the expansion of electrochemical and electrometallurgical industries, and at the same time to give the business interests of the South, as well as of the country, an idea of the vital importance of these industries to the industrial life of the nation, the MANUFACTURERS RECORD is publishing in the following pages a symposium from these two standpoints.

Necessarily, the articles on the South's resources for these industries can but briefly sketch the all-around advantages of this section, but they are sufficient to give the members of this society an insight into the remarkable potentialities of the Appalachian South and its vast storehouse of water-powers and minerals suited for their industries.

On the other hand, the articles by noted electrochemists will convey in a striking and impressive manner some authoritative facts about the broad and, indeed, vital importance of electrochemistry and electrometallurgy, not only upon our industrial life, but upon, what is of supreme importance at this time, the successful prosecution of the war.

In this symposium section a number of communities and far-seeing business interests have inserted special advertisements, calling particular attention to opportunities available at special points in the Appalachian South for these industries, and a number of manufacturers are also calling attention to products, machinery and equipment developed for use in these industries.

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WHAT THE VISIT OF THE ELECTROCHEMISTS TO THE SOUTH MAY MEAN TO THE NATION AND TO THE WORLD

OF far-reaching national and international importance, bearing directly upon our ability to win the war and upon the world ramifications of our trade after the war, will be the meeting in the South of the American Electrochemical Society.

In all of the work which the Manufacturers Record has done in times past to bring to this section great conventions of cotton manufacturers, of the American Iron and Steel Institute, of the American Bankers' Association, of the Good Roads Congress and kindred organizations, we do not believe that any of these meetings has ever been fraught with such tremendous importance as that of the American Electrochemical Society.

This is the day of the chemist, the creative genius of the world. It is the day of hydro-electric power, and the two great influences for the world's material advancement are united in the activities of the American Electrochemical Society.

Without the utilization of abundant and cheap water-power the electrochemical industries could never have reached the dominating position which they now hold in all the varied ramifications of metallurgy and of all the manufacturing interests which enter into the life of the country. Without the development of these electrochemical industries we could never have created many of the great industrial enterprises upon which the life of the nation rests today.

The Electrochemical Society, combining in its membership many of the great leaders in chemistry and in electric work, brings together the mighty forces represented by both.

The development of Niagara's hydroelectric potentialities made possible much of the progress of recent years in the production of things which enter into varied lines of industry essentially now a part of the very business life of the country. But Niagara has practically reached the limit of its available power, and to the South the nation and the electrochemists have had to turn for the development of water-powers, the utilization of which will make feasible the duplication in the South of more than has been achieved in the marvels wrought at Niagara.

Out from the vast industries centering around Niagara have grown forces which are changing the agricultural life of the country, which have made possible the creation of many lines of metallurgical activity, and which have opened to the entire nation a new vista of the limitless possibilities which the future holds for us if we but co-operate with natural advantages in the utilization of these opportunities.

In the Appalachian South there are vast water-power potentialities, and the National Government has found that it must look to this section for the production of nitrate and for many other lines of work which are vital factors in the great contest for the nation's existence, and which when the war has been won—as won it will be—will be of limitless value in enlarging the nation's agricultural output and in developing and increasing its metallurgical and chemical activities.

It is well, therefore, that the members of the American Electrochemical Society have been persuaded to make their annual meeting a trip on a special train to the Appalachian South; for in this section they will have the opportunity of studying, as they could do nowhere else, the boundless resources which of necessity will appeal to men of eminence in the world of chemistry and electricity, and of all the manufacturing interests upon which they will bear.

To many of these men, who will visit the South for the first time, this section we are sure will prove a revelation. Some of them have heard by word of mouth or through the reports of others, that the opportunities in the South are great, without ever having had these facts deeply driven into their consciousness by any personal contact. We are sure their eyes will be opened, and before the marvelous combination of advantages and resources possessed by the South they will stand dumb with amazement. No words will be able to express soberly and with the precision of the scientist the full measure of what they will see; for we believe that many of them will scarcely bear to trust themselves to give voice to the realities of the South for fear they may be charged with having ceased to be scientists and become overenthusiastic optimists.

In welcoming these men to a study of its resources, the South

will be giving an object-lesson to the very foremost scientific men of America, upon whose judgment the great capitalists of the nation depend, and whose investments must largely be guided by what these experts may say.

It will be well for these experts to bear in mind that the South has a combination of advantages of which they will be able to get only the merest glimpse in the brief survey which they will be able to make on their short trip. But they will bear in mind also that in this Heaven-favored region there are resources which make the South the nation's greatest asset.

It will interest them to know that the South has about five times as much coal area as all of Europe, excluding Russia, and twice as much as all of Europe including Russia; and this without taking into account the vast areas of lignites which in the future will prove of immense value.

They will also remember that about three-fourths of the coking coal land of the United States is in the South; that this section produces 99 per cent. of the entire sulphur output of the country—so essential in chemical work of the widest range.

It will interest them to remember the South produces about two-thirds of the cotton crop of the world, the value of which when measured by its influence upon industry, upon the production of explosives, and upon finance is entirely beyond the possibility of words to express; for the \$2,000,000,000 which the South will this year receive for its cotton and cottonseed in their raw state is but a trifling sum when compared with the intrinsic value of cotton and cottonseed on the life of this country and of all other civilized nations.

The South still holds a world monopoly of cotton, and though other regions have for nearly a century vigorously sought to develop cotton growing in competition with the South, the position of this section as the dominant power of the world in cotton production grows steadily stronger.

And yet cotton represents only about 30 per cent. in value of the total value of the agricultural products of this section, and with higher fertilization and better cultivation it would be possible to double the total agricultural output of the South without materially increasing the acreage under the plow. The production of nitrates in the South should materially lessen the cost of fertilizers, and thus help to enrich the soil.

It was a Southern cement company which was the first concern this side of California and the second in the United States to prove the feasibility of saving potash as a by-product in the production of Portland cement; and now other cement companies are equipping their plants to save the potash which has heretofore been wasted. It has been demonstrated that in some of the iron ores of the South there is a percentage of potash which if utilized would practically eliminate the cost of the iron through the value of the potash saved. And thus this section may yet be able to make the country practically independent of the potash of Germany, and in this way tremendously strengthen every industry, from agriculture to the widest ramifications of manufacture, by its potash output.

This region, so prolific in oil and gas, producing more than half of the oil output of the United States, with the largest known natural gas output in the world, offers in this particular many interesting avenues for the investigation of the chemist. The aluminum industry, which bears such a vital relation to the activities of trade, is wholly dependent upon the South for its raw material; and the plants which are now in existence in the South producing aluminum will make the bulk of the supply turned out in the United States.

But it would be useless to attempt to catalogue the varied resources of the South in cotton, and coal, and oil, and gas, and sulphur, and phosphate rock, in iron ores and lumber, in marbles of every variety, in graphite, in granites which are almost without end, and in many of the finer materials of which the development is as yet but in its infancy; indeed, it may be said that none of these great resources of the South have been really developed. We have only begun to touch the surface; to do the pioneering work of clearing the ground and cutting out a tree here and there; of building the log house in which the pioneer begins the opening up to civilization of a new region. The South has been doing pioneering work. Its in-

dustrial and agricultural interests as thus far developed are merely signs or indications of what can be done. As compared with the future, they are but as the little cleared spot and log house of the pioneer in the Western country of olden days, in contrast with the mighty activities and enormous wealth of the same section today.

We are passing from the pioneering stage into the day of real development in the South; and fortunate it is for the nation that these electrochemists are for themselves to make a study of the situation, because here they will see a field which opens to them and to their associates an opportunity for the broadest achievements that have ever been made in all the nations of the world in electrochemistry and all the activities connected therewith.

On behalf of the South and in the name of the pioneers who have been doing the preliminary work of Southern development, we welcome these men, that they may see for themselves, and that they may go back to their homes and preach through the press and through

their reports the story of this Wonderland—the land well designated more than 25 years ago by Hon. Wm. D. Kelly of Pennsylvania as “the coming Eldorado of American adventure”; a land the development of which he said “would mean the enrichment of the nation”; a land which for many years the MANUFACTURERS RECORD has claimed to be the greatest asset of the nation, and the development of which would add more largely to national wealth and strength and national power than that of any other section of America. And we have said this, not from a narrow, sectional viewpoint of love of the South, but from the broader viewpoint of the nation's life, that the South with its three-fifths of the nation's coast line, with its marvelous mineral and timber wealth, its water-powers, developed and undeveloped, its unmatched climate, is in itself a source of such limitless potentialities for the enrichment of the nation that it is incumbent upon the nation to utilize these resources for its own welfare.

The Appalachian South and Its Electrochemical Industries

By COLIN G. FINK, PH. D., President American Electrochemical Society.

The scope of the electrochemical industries can best be appreciated by enumerating a few of the characteristic products, products so vitally essential to our economic welfare in times of peace and at the present time so unquestionably necessary for the successful prosecution of our life struggle for the liberty of our land and freedom of the seas. Aluminum, copper, electric steel, ferro alloys, artificial abrasives, oxygen and hydrogen, calcium carbide, and cyanamid, chlorine and alkalies—these are but a few of the many varied products that are daily turned out by the ton in the electric furnace and in the electrolytic cell.

One of the direct benefits of the European War is the rapid realization of our people of the vast wealth and resources of our own country. And in no part of the United States has this been more forcibly demonstrated than in the South. Within the last few years the industrial development of the South has proceeded at a marvelous pace and there is every indication that it will continue thus for many years to come. As an electrochemical center the Appalachian South is most ideal and bids fair to become, within a very short time, one of the leading centers of the world.

What constitutes an electrochemical industrial center? What are the underlying requirements? What are the raw materials needed for the production of that long list of metals, alloys, carbides, fertilizers, abrasives, lubricants, solvents, etc.? The first essential is an abundant supply of cheap power—power to be had in large blocks for 24 hours a day and 365 days a year! Cheap power is almost always synonymous with water-power—and of this the Appalachian South has been supplied by nature in gracious abundance. In the State of Tennessee alone, according to the estimates of Professor Switzer of the United States Geological Survey, there are available almost one million horsepower. In other words, Tennessee alone has enough power available to foster an electrochemical industry twice the size of that existing at Niagara Falls today! Another cheap source of power accessible in the South and of interest in particular to undertakings of moderate dimensions is natural gas. West Virginia produces 250,000,000 cubic feet of natural gas per annum, over twice that of its nearest competitor, Pennsylvania. When the Government sought to establish the nitrogen fixation industry in this country for the electrochemical production of those most vital compounds ammonia and nitrates—without which we could neither feed our populace nor defend our borders—and thereby guarantee against any possible curtailment of the nitrate shipments from Chile, the Government, after due deliberation, most wisely decided to erect the “air saltpeter” factories at the famous water-power site, Muscle Shoals. As regards the supply of cheap water power in the Appalachian South therefor, there is no doubt. Careful surveys have reported a vast abundance.

Next in importance to the supply of cheap power is the accessibility of raw materials. Here again the South has been strikingly favored by nature. The aluminum industry, one of the largest of the electrochemical industries, requires as its basic material in the process of the manufacture of that “metal of many uses” a mineral called “bauxite.” There are but four States in the whole country that have been producing bauxite in commercial quantities—Georgia, Alabama, Tennessee and Arkansas. In 1917, 400,000 metric tons of bauxite were mined in these States. This is 12 per cent. more than the total world's bauxite output in 1910. The Aluminum Company of America has a large metal-producing plant at Maryville, Tenn. Bauxite is also used for the manufacture of “alundum,” an abrasive of great hardness made in the electric furnace and one which is rapidly replacing the imported emery and corundum. Another strong competitor of these natural products is “carborundum,” likewise made in the electric furnace.

Carborundum is formed by bringing into reaction at very high temperatures, such as can only be obtained by electricity, two familiar substances, coke and sand. Both raw materials are readily accessible in the South.

Of other electrochemical products the ferro alloys and electric steel are perhaps the most important of all. It has been repeatedly pointed out that without these electric furnace products the automobile industry would never have developed as it has. Furthermore, aeronautics would still be in the experimental stage, for without the electric alloys flying machines would be at least 10 times as heavy as they are today. We mention here but a few of these very essential ferro alloys. Ferro titanium is composed of two metals, iron and titanium. Titanium is derived from the mineral “rutile.” For many years the sole producer of rutile in this country has been the American Rutile Company, whose plant is located at Roseland, Va. Another ferro alloy upon which the steel manufacturers are very much dependent is ferro manganese. Manganese ores have for years been imported mainly from Brazil. We are trying to make our country independent of this supply and lately the Government has requisitioned most of the ships that have been carrying the ore to our ports. Deposits of manganese occur in many parts of the United States, but are most abundant in the Appalachian and Piedmont regions. The principal producing districts have been the James River, Staunton River and Blue Ridge regions of Virginia, and the Cave Springs and Cartersville districts in Georgia. Commercial quantities of manganese have also been produced in Tennessee and South Carolina.

Electric steel has far surpassed in quality the best crucible steel. The South furnishes over 12 per cent. of the iron ore of this country. Next to Minnesota and Michigan, Alabama is the largest iron State in the Union. Birmingham as a steel center is too well known to need mention here.

Carbon bisulphide, a solvent upon which the rubber industry is dependent, is made entirely by electrochemical methods. The chief constituent, sulphur, is mined in Louisiana and Texas. The combined output of these two States exceeds not only that of all other States put together but that of all the rest of the world.

Another electrochemical industry which has developed to considerable magnitude in all civilized countries is the alkali and chlorine industry, furnishing valuable disinfectants, bleach, caustic soda, sodium metal, chlorine gas, and others. The basic raw material is common salt. It is interesting to note that Virginia is sixth largest salt-producing State in the country.

An electrochemical product which has gained great significance in the past 10 years is calcium carbide. This compound is made in the electric furnace from limestone, abundant in the South, and coke, likewise readily obtainable. From calcium carbide is made acetylene, which is used in lighting, but chiefly in oxyacetylene welding. We need hardly mention the universal adoption of acetylene welding and cutting and the millions of dollars that are annually conserved in labor and material by this new epoch-making art.

Calcium carbide is the starting material of a second valuable electric furnace product, calcium cyanamide, which used as a fertilizer furnishes the plants with that very essential constituent nitrogen. The South is already producing tons and tons of this electric fertilizer and since the South, notably Florida, Tennessee and South Carolina, also furnishes the whole country and about one-third of the world besides, with phosphate, a second essential plant fertilizer, there is every reason to believe that the South will one day be the greatest fertilizer industry center.

We could continue to enumerate product after product made in the electric furnace and in the electrolytic cell and show how admirably well the Appalachian South is situated to foster most of the important electrochemical industries within its borders. The South has the cheap power, it has the raw materials and is within easy access of the world markets. If we look upon the developments that have already been made—aluminum, nitric acid, cyanamide, steel, ferrosilicon—it is not hard to prophesy that the Appalachian South will soon become one of the greatest electrochemical centers of the world.

The Psychological Moment in Southern Development

By DR. CHAS. H. HERTY, Editor, The Journal of Industrial and Engineering Chemistry.

The luncheon table is more efficient than the mails or public press, if co-operation is to be effected between individuals of well recognized standing, but personally unacquainted. In such congenial surroundings, the eye-to-eye conference affords fullest opportunity for the rapid adjustment of slightly varying points of view, and the welding of bonds of personal sympathy and respect.

True as applied to individuals, this statement applies with even greater force to groups of men. For this reason it is a matter of the greatest good fortune that the 1918 spring meeting of the American Electrochemical Society is to be held in the heart of the power section of the South. That the Society has before it a week of unbounded hospitality and generous entertainment in this land of warm welcome can be predicted without hesitation. The organization includes in its membership those men who already have made America the leader of the world in electrochemical industries. The manifold activities at Niagara Falls, which constitute now one of the most valuable contributions to our war power, are the direct result of their skill and scientific attainment. These men have not hesitated in making pioneer effort, which with unusual rapidity has become an established part of the Nation's progress.

This wonderful development at Niagara Falls has been due to the availability of power and a ready access to markets, rather than to the proximity of raw materials. At present there is a marked shortage of power at that important electrochemical center, and the eyes of electrochemists are naturally turning to other sections of the country for further sources of power. To what other section of the country should they more naturally look than to the South, where potential power and largely undeveloped raw material lie side by side, with markets for many of the products close at hand.

In this connection let me quote from the address which I made at the opening session of the meeting of the American Chemical Society at New Orleans in April, 1915:

"Even today shall we rest content with utilizing this power simply for pur-

poses of transportation and illumination while we remain a producer of raw material? This same water power converted into the form of the electric current can set free your chlorine, can make available the nitrogen of the free air for nitric acid, and can isolate your aluminum. Our thoughts for the future development of chemical industries in the South must turn to the better utilization of our now almost neglected water powers."

The approaching meeting of the Electrochemical Society will furnish the occasion for giving definite direction to those thoughts, for securing the best of expert advice, and for developing that spirit of personal, sympathetic co-operation which has so often guaranteed success in other large lines of commercial development.

Particularly fortunate is the fact that the meeting is to be held at a time when a marked getting together of all elements associated with the problems of power development is so evident. The conflicts between the extreme conservationists and those oppositely inclined have given way under the needs of war conditions to a harmonious recognition of the inherent rights of all the people to these water powers, and of necessity for their development if the people are to benefit from those rights. This blending of opinion has taken definite form in the Administration water power bill, whose strong claim upon immediate public support is the coal shortage of the past winter and its probable recurrence next winter. Water power is easily interpreted in tons of coal, and tons of coal in terms of railroad transportation. The country is fully prepared to demand the quick conversion of its wasting waters into a great national asset.

The presence in the South of the organized body of electrochemists, while there is crystallizing a public sentiment for water power development along sane lines which will insure the contribution of still greater riches by that favored section to the national wealth, marks the psychological moment for the inauguration of a new era in Southern development.

Southern Tour of American Electrochemical Society

By CHARLES F. ROTH, Manager National Exposition of Chemical Industries and Chairman Arrangements Committee, Southern Tour, American Electrochemical Society.

In an address before the Washington Academy of Sciences, S. J. M. Auld of the British Military Mission, speaking on "Methods of Gas Warfare" last January, said: "It is within the realm of possibilities that the war will be finished, literally, in the chemical laboratory."

Long before these United States entered the war the chemical industries were mobilized; firstly, to prevent a recurrence of conditions that would leave us in a state of exhaustion because of our dependence on a foreign power for those necessary products of the chemical industry essential to all our industries; secondly, to meet the great demands made upon us by those now our allies in this war for war supplies and munitions, and now lastly, to seek that utmost peak of attainment, the preservation of our national existence and with our allies to prosecute this war to a successful conclusion.

Upon the chemical industries rests the burden for the production of war materials and munitions; directly or indirectly, all industries producing material used for the maintenance of the war are dependent upon chemical industry. These pressing needs brought into existence plants whose operation had been worked out in the laboratory, the development of resources, the possibilities of which had been demonstrated in the laboratory. The end is not yet. The Government must have all the resources of the country developed for war purposes.

The nation is rich in resources, men and money; these three brought together produced the industries that make it possible for the Government to maintain an army and navy at the fighting lines and send regularly material supplies.

At the National Exposition of Chemical Industries, held annually in New York for the past three years, these three elements have been brought together, and from it has come order out of chaos and industries where none existed. Viewing the wonderful exhibits of raw materials and some of the products made therefrom, in the southern section of the exposition last September, the minds of the directors of the American Electrochemical Society were moved to a closer study and consideration of the situs of those materials. With the unprecedented development of the chemical industries, that branch of them, the electrochemical industries, had great demands for their product, in the manufacture of which large amounts of cheap electric power are required. The electrochemical center of the country had developed at Niagara Falls because of the cheap hydro-electric power available at that point, but for a long time the pinch of an inadequate supply had been felt there. The new demands for increased output compelled American industries located there to move to Canada to secure power from the falls, since by Canadian law it could not be exported into the United States. American electrochemical industries have contemplated and are establishing themselves in other foreign countries, notably Norway, in order to secure sufficient power. With the exception of a trifle more power to be developed at Niagara Falls by authority of Congress, the development of power there is at a standstill—the spectacle must be preserved—for honeymooners.

Industry must continue, cheap power must be supplied the electrochemical industries. Some sections of the country possess potential power in quantities that are financially and commercially possible of development. The Appalachian South, the section selected by the American Electrochemical Society to be seen,

possesses this, and in addition holds a wealth of natural raw material suitable for chemical industry and industries. As chemical industrial centers the points to be visited are developing. All of them will be an inspiration to the members of the society who make the tour—which at the same time is the annual meeting of the society—because of their own several local opportunities, possibilities and accomplishments.

At Kingsport, Tenn., the first city visited, it will be a grand inspiration of what a group of determined men have accomplished through the intelligent development of the natural resources they found in the surrounding hills and mountains. Here will be viewed what is quite nearly a complete cycle of chemical industries, where those basic materials over which farmers, lumbermen and hunters have stumbled for ages are being turned into products not only necessary to the maintenance of the war, but to the comfort of man. Some few of the products being produced from the plants—and the plants there are built with the determination that they be permanent, showing the spirit of the men who built them—are brick, drain tile and sewer pipe, glass, lime, Portland cement, tanning extracts, leather, glue, paper pulp, paper, explosives, dyestuffs and electric power from coal. Carrying away the inspiration of this city, members will see in the resources along the tour the opportunities therein; they will have visions of plants and factories growing up about the country, and visions of the future will be carried in their minds.

Knoxville, the second objective point, will furnish an inspiration in the plant at Mascot, where low-grade zinc ore of about 4 per centum values is concentrated by jigs and flotation using the Minerals Separation Co.'s process to a product of 60 per cent. ready for the smelter. What has been accomplished in the development of hydro-electric power on the Little Tennessee River by a series of dams to provide reservoir capacity for a steady supply of 400,000 horse-power for the Aluminum Company of America is a feature that will have an active interest for the members and indicate how much such typical sites scattered throughout the region can be developed.

Chattanooga, too, as a center of electrochemistry will occupy attention; some of the power possibilities will be seen, and the plant of the Southern Ferro-Alloys Co., which is already making ferrosilicon and other alloys of iron, will be one of Chattanooga's chemical industries to command the members' attention.

Muscle Shoals, in Alabama, with its \$30,000,000 Government plant, consisting of a synthetic nitrate and a cyanamid plant, together with the great 680,000 horse-power development of the waters of Muscle Shoals, most of which power will be available for use of private companies, will center the interest upon an industrial center the development of which will read like an Arabian Nights story at a date in the not distant future.

Birmingham, the Pittsburgh of the South, with its iron and steel plants drawing their supply of raw material, iron ore, limestone and coal from the surrounding foothills, in this respect at present incomparable with any other iron city, will, as a center that has grown in one generation, have a keen interest for the members of the society.

The tour will conclude at Anniston, Ala., May 4, where electric ferromanganese furnaces and electric steel furnace plant will be inspected.

Water-Power Development in Appalachian Region

By J. A. SWITZER, Professor Hydraulic Engineering, University of Tennessee, Knoxville, Tenn.

In a paper read before the Southern Commercial Congress a few years ago, Mr. George Westinghouse stated that the estimated total available horse-power of the streams rising in the Appalachian Mountains amounts to between 5,000,000 and 7,000,000 horse-power, and stated further that this power, if fully developed, would save annually 25,000,000 tons of coal. To emphasize the prodigious loss which the non-utilization of the yet undeveloped water-powers represents, Mr. W. P. Lay at the same meeting stated that the amount of power going to waste in the rivers of the State of Alabama would require, if produced by steam, the consumption of 80 per cent. of all the coal mined within the State.

Nevertheless, in the face of many deterrent forces, the process of harnessing these water-powers is proceeding at a rate so rapid that unless one stops to get a proper historic perspective of the process, he will fail utterly to comprehend its economic trend and tremendous significance.

Consider the fact that 30 years have not yet elapsed since the first water-power development using electrical transmission was installed in this country! The hydro-electric industry is but 28 years old! Only 23 years have passed since the first transmission line in the South was built! And yet, before the year 1918 shall have passed into history the total of installed capacity of hydro-electric plants in daily operation within the States of North Carolina, South Carolina, Georgia, Alabama and Tennessee, comprising the Appalachian region, will exceed 800,000 horse-power! And supplementing this, there will be in the combined capacity of auxiliary steam plants no less than 210,000 horse-power. These figures do not include any water-powers not parts of hydro-electric systems, nor any plants of less than 1000 horse-power installed capacity.

Truly the "infant industry" of taming the rivers can fairly claim to be a vigorous youngster.

Great as have been the accomplishments of the quarter-century soon to close, I venture to predict that they will pass into eclipse before those of even the decade to come.

Never, since the dawn of civilization, has the need for increasing the available mechanical power of the world equaled the present need. And if this be true of all mechanical power, it is true in the superlative degree of water-power.

We are familiar with the slogan, "food will win the war." It would be equally trenchant to say "power will win the war," and if we are to prevent the Hans from dragging us all the way back to the dawn of civilization, it is imperatively necessary that we greatly augment our use of water-power. With the new scale of prices for coal now obtaining, and the certainty that as long as the war lasts the coal shortage will last, it follows as a logical sequence that the intrinsic value of water-power must greatly enhance. But with the termination of the war will come the period of world rehabilitation, and for that reason it is highly probable that for many years to come the demand for power will be sustained. One can scarcely believe that the price of coal will ever again recede to the pre-war level, and every increment in the cost of steam-generated power by the same token spells an equal increment in intrinsic water-power values. Hence if we assume that prior to the war the limiting capital cost of development of a water-power project, to be commercially attractive, was, let us say, \$120 to \$125 per horse-power, it must permanently advance from this figure in at least the same ratio as the cost of steam-generated power increases. If this reasoning is sound, we may confidently look forward to an era of intensified activity in the water-power field.

Probably most of the readers of the MANUFACTURERS RECORD are familiar in a general way with the existing water-power developments of the Appalachian region; but it may be of interest, nevertheless, to present here a brief summary of the more important of these.

In the Carolinas the dominant corporation is doubtless the Southern Power Co. This company has in operation eight water-power and four steam plants, as follows: Water-power stations—Ninety-nine Islands, 24,000 horse-power; Saluda, 3500; Catawba, 10,000; Fishing Creek, 40,000; Great Falls, 32,000; Rocky Creek, 32,000; Lookout Shoals, 5000; Bridgewater, 30,000. The steam plants have a capacity of 10,000 horse-power each, and are located, respectively, at Saluda, Mt. Holly, Greensboro and Eno. Hence the company's present installed capacity is 176,500 horse-power in hydro-electric and 40,000 horse-power in steam plants. The company operates 1550 miles of transmission lines. On the north their transmission line ties in with that of the Carolina Light & Power Co., and on the south with the Georgia Railway & Power Co., at Tallulah Falls, Georgia.

The Carolina Light & Power Co. operates water-power plants on the Cape Fear and the Neuse rivers, and steam plants at Raleigh, Goldsboro and Henderson, aggregating 10,100 horse-power. It operates 188 miles of transmission lines. Controlled by this company is the Yadkin River Power Co., with 32,000 hydraulic horse-power at Blewett's Falls and 185 additional miles of transmission.

The North Carolina Electrical Power Co., doing business in the Asheville district, has 7500 horse-power installed in three hydro-electric plants on the French Broad River and 3500 horse-power in steam.

Higher up on the Yadkin, at the Narrows, is the now famous plant, recently completed at Badin by the Aluminum Company of America, where 93,000 horse-power is generated.

Proceeding toward the south we come to the Pan Shoals Power Co., whose plant on the Broad River, near Columbia, S. C., generates 24,800 horse-power.

Next we encounter the Stevens Creek development of the Georgia-Carolina Power Co., on the Savannah River near Augusta, generating 31,000 horse-power. And then the Columbus Power Co., with a hydraulic plant at Goat Rock, and three more within the city of Columbus, all on the Chattahoochee River, and one steam plant, with a total capacity of 54,000 horse-power.

The Central Georgia Power Co., centering around Jackson, operates a 24,000 horse-power plant on the Ocmulgee River and a steam plant of 8000 horse-power at Macon. This company operates 154 miles of transmission line.

The largest operation in the State of Georgia undoubtedly is that of the Georgia Railway & Power Co. This company's present equipment consists of water-power plants at Tallulah Falls, Bull Sluice and Dunlap, with a total capacity of 130,000 horse-power, and two steam plants of 30,800 horse-power. Their ultimate capacity will be 578,000 horse-power. Their transmission system aggregates 676 miles, and beside connecting with that of the Southern Power Co., also connects with the Columbus Power Co. at Newnan, the Central Georgia Power Co. at Atlanta, the Tennessee Power Co. at the Tennessee-Georgia State line, and will soon connect with the Alabama Power Co. at Cedartown.

Coming to Alabama, we find only one large concern generating power, the Alabama Power Co. Their plant on the Coosa River, at Lock 12, has recently been enlarged from 70,000 to 90,000 horse-power. It also operates a steam plant of 33,000 horse-power capacity at Gadsden, and has only just completed a second on the banks of the Black Warrior River of 30,000. This last plant the Government has taken over to furnish power at Muscle Shoals.

Passing up on the western slope of the Appalachian Mountains, we come to the Tennessee Power Co., which owns two hydraulic plants on the Ocoee River aggregating 45,000 horse-power, and one plant of 12,000 horse-power capacity at Great Falls, on the Caney Fork River. The company operates, under lease, the Hales Bar plant of the Chattanooga & Tennessee River Power Co. on the Tennessee River below Chattanooga, where the installed capacity is 58,000 horse-power. The company owns steam plants as follows: 17,300 horse-power at Parksville, 6600 at Chattanooga and 20,000 at Nashville. It also has an operating agreement with the Knoxville Railway & Light Co. whereby the 9000 horse-power steam plant at Knoxville is also available. The company operates nearly 1000 miles of transmission line.

Two other companies operate in Tennessee, the Tennessee-Eastern Electric Co., with a development of 3000 horse-power on the Nolichucky River (and an ultimate capacity of 14,000), and 1800 horse-power of steam at Johnson City, and the Watauga Power Co., with a plant of 3200 horse-power capacity, on the Watauga River.

This gives a fairly complete catalogue of plants completed and in operation.

On the Little Tennessee River and its tributaries the Aluminum Company of America are at work constructing a series of nine dams, which will develop approximately 400,000 horse-power. The first dam will be completed during the present year, and will yield 80,000 horse-power. At the great reduction plant at Maryville the company operates a steam plant of 10,000 horse-power capacity.

We thus see that the generating capacity of the plants of the Appalachian region have grown in 23 years from nothing to over 1,000,000 horse-power. Very little of this power is at present for sale, for all except the merest fraction has been absorbed by the various industries which during the same period have come into being.

Truly the South may look at this accomplishment with just pride!

The Niagara of the South

By PROF. WILLIS G. WALDO, Consulting Engineer, Nashville, Tenn.

The coming of the American Electrochemical Society to the Appalachian South marks a new epoch in the industrial history of that great populous section which stretches from the Ohio and Mississippi rivers on the north and west to the coasts of the Atlantic and Gulf. Here, amid a greater variety of nature's treasures than is to be found anywhere in our land, the electrochemical industries can find, in close association, an abundant supply of water-power, together with all of those contributing factors of proximity to markets, suitable labor supply and favorable climatic conditions which make for industrial

success and supremacy. There have been many general statements made regarding the wealth of this section in mineral resources and in undeveloped powers, but the South has no need to generalize in pointing to the possibilities of this section as a location for electrochemical and electrometallurgical industries.

Foremost among the water-powers of this great territory, surrounded by the potential wealth of mine, field and forest, is the Niagara of the South—Muscle Shoals. If the South could offer no other site for the development of

cheap power for these important industries, still it would have premier claim as a location for such establishments by virtue of the power at Muscle Shoals alone.

It is the purpose of this paper to summarize briefly the developments which are in progress at Muscle Shoals and to point out in a measure their remarkable significance and value to the electrochemical industries.

THE MUSCLE SHOALS NITRATE PLANTS.

Among the most notable Government enterprises in the United States today, in point of money involved as well as in point of vital military and economic functions expected of them, are the two emergency nitrate plants now being rushed to completion on the south bank of the Tennessee River at the foot of the Muscle Shoals. Constructed though they are in great haste because of the present critical emergency and built in every sense as a war measure, their usefulness, nevertheless, will not cease nor be curtailed with the close of the war, for the identical plants which produce ammonium nitrate for the manufacture of explosives in time of war may also produce ammonium phosphate, an improved modern commercial fertilizer, high in quality and low in price, under especially favorable conditions at this great power site.

Extending into the western portion of the city of Sheffield, Ala., and reaching two miles out into the adjacent country, is a Government reservation of 1700 acres, where Nitrate Plant No. 1 is under construction. It will employ a modification of the Haber process, developed by the General Chemical Company and now for the first time to be tried out in a commercial way. The first three units are being erected at a cost of about \$6,000,000, and it is expected that ammonium nitrate will be produced here early this summer.

Adjoining the city of Sheffield on the east is a second reservation which comprises 2200 acres and extends almost to the site of the great power dam which is to be built in the Tennessee River. On this reservation 10,000 men are working day and night, using millions of dollars' worth of equipment in the huge task of erecting Nitrate Plant No. 2. This plant will employ the well-known cyanamid process, which has to its credit a record of unbroken success on both sides of the Atlantic, although this will be the first plant of this kind to be erected in the United States. While it is ultimately expected that Nitrate Plant No. 2 will be operated by hydro-electric power from the Tennessee River, the source of power in the present emergency will be a 60,000-horse-power steam plant, which will be supplemented by a large supply of power obtained from the Alabama Power Company over a specially built transmission line. Upward of \$30,000,000 will be expended and the permanent employees will comprise many thousands.

THE HYDRO-ELECTRIC DEVELOPMENT.

Of all the features of interest to be seen by the electrochemists on their tour of the South, none will probably command greater interest than the \$16,000,000 power and navigation dam which is to be built by Col. Hugh L. Cooper in the Tennessee River at Muscle Shoals. It will be about 4500 feet long and 104 feet high, will be equipped with a triple-lift lock, and will provide for the ultimate installation of machinery for generating 480,000 horse-power, according to present plans. It is estimated that it will be completed within three or four years, and the estimate of 1,200,000 cubic yards of concrete which it will contain indicates that here will be erected the largest concrete dam in the world. Compared with this giant among masonry dams, the engineering feats of former days are completely overshadowed, for even the Roosevelt dam, 200 feet high, is but 680 feet long and contains only 69,000 cubic yards of concrete. Even the new Croton dam of the New York water supply will be outdone, for its length is but 1200 feet and it contains 855,000 cubic yards of masonry.

Eight miles farther upstream is the site of the upper power dam. Here will be built the longest dam in the world, for its length of 6425 feet will exceed that of the Assouan dam in the Upper Nile by about 25 feet. Here it is planned ultimately to install machinery for generating 180,000 horse-power.

These two dams will develop 660,000 horse-power, or about 85,000 horse-power more than now available at Niagara Falls, and will form two picturesque artificial lakes of great natural beauty, the lower lake covering an area of 9025 acres, and the upper lake 25,470 acres, their combined area being some 55 square miles.

The most significant and promising feature of this entire development is the cost at which this power can be produced. Developed as it is by the Government with its cheap money, the interest charge is hardly more than a third of that which would be involved were this work done by private enterprise, and inasmuch as 80 per cent. or more of the total operating expenses of a hydro-electric plant consists of interest on the investment, the cost of the Muscle Shoals power will be very low, in fact, estimates approved by U. S. Army engineers indicate that the cost of this power will amount to \$7 to \$9 per horse-power year, allowing interest at 4 per cent. on the Government's investment and depreciation at 10 per cent. annually on machinery and 2 per cent. on all other improvements.

Assuming that 260,000 horse-power will be required by industries already established here, there would still remain 400,000 horse-power of energy, nearly or equally cheap as that of the water-powers in Norway.

When we observe the electrochemical industries shipping their raw materials from New Caledonia, Rhodesia, Turkey, Asia Minor and other remote points to a source of cheap power as distant as Norway, we feel that were there no great supply of raw materials for electrochemical industries to be had in the Appalachian South and no inducement save that of the Muscle Shoals power to be offered them, it would still be the coming center of electrochemical industry. There is but one locality in this country with which Muscle Shoals can be compared in endeavoring to point out its value to the electrochemist.

That locality is Niagara Falls.

TWO GREAT AMERICAN POWER CENTERS.

In 1890 Niagara Falls was a village of 5491 persons, most of whom made their living from the tourists who visited the place annually in large numbers. In that year the development of the hydro-electric power was begun, and in 1917 the population of Niagara Falls was estimated at 60,000 inhabitants, while the value of the electrochemical products, rising from nothing in 1890 to \$18,450,000 in 1913, is now said to exceed \$60,000,000 annually. This result has been accomplished in spite of the fact that the locality of Niagara Falls is not especially favored with a great variety of raw materials which go into the manufacture of electrochemical and electrometallurgical products. Aside from the production of limestone, the principal quarries of which are at the foot of Lake Ontario, some 150 miles northeast of Niagara Falls, the principal producing districts are the salt district of central New York, ranking second in production in the United States (in 1914); the pyrites district of St. Lawrence county, ranking third among pyrites districts in quantity of output, and the local production of coke at Buffalo, ranking similarly twelfth among American coking districts.

Muscle Shoals, on the other hand, is surrounded by many of the most important producing districts in the United States in a great variety of materials. In fact, if a circle of 300 miles radius be drawn with Muscle Shoals as a center, it will include a greater variety of commercially produced raw materials suitable for electrochemical and electrometallurgical industries than is to be found within a similar area anywhere else in the United States.

Within this area are America's largest producing districts of bauxite and fluorspar, the second largest in phosphate rock, coke, bauxite and barytes, the third largest in iron and barytes, the fourth largest in bauxite, the sixth largest in pyrites, the seventh in zinc, and the eleventh in copper, while sulphuric acid, graphite, limestone, cotton and wood waste, which are all important essentials, are produced in great quantity, and at short distances outside of the circle are found the country's largest producing districts of sulphur, zinc, barytes, coke, pyrites, manganese and phosphate rock.

To attempt to point out in detail the many industries using large amounts of electric power for which this site will be ideal would exceed the limits of this paper. One example will illustrate the possibilities.

CHEAP ELECTRIC POWER IN THE SOUTHERN STEEL INDUSTRY.

It is well known that the development of the iron and steel industry of the South has been greatly retarded in the past because of the non-Bessemer character of the ores, due to their high content of phosphorus and sulphur, which could not be removed in the blast furnace. The development of the electric furnace, however, has demonstrated that the highest grades of steel, equal even to the expensive crucible steel, can be produced from ores which themselves are high in phosphorus and sulphur, by the employment of the electric furnace as a means of refining open-hearth product, and the highest authorities state that the general use of the electric furnace for this purpose is dependent upon the cost of electric power. With brown ore both to the north and the south, and with an enormous quantity of hydro-electric energy at her very door, Muscle Shoals, the center of cheap power, has indeed a promising future. In addition to electric furnaces for steel production and for the manufacture of fertilizers, a great variety of other plants dependent upon cheap electric power for their profitable operation will find a favorable location at the Shoals. Among such plants may be named those producing caustic soda, caustic potash and lye, hydrochlorites, chlorates, alloys of iron with silicon, chromium, titanium, tungsten, manganese and other ferro-alloys, aluminum, calcium carbide, abrasives such as alundum and corundum, electrodes (of which the country is now experiencing a most serious shortage), sodium and sodium peroxide, phosphorus, silicon, chlorine, carbon bisulphide, muriatic acid, oxygen and hydrogen, paper, wood pulp, graphite, and a long list of others. It is in the establishment under profitable working conditions of such industries as these that the benefit of cheap power are realized, rather than in the reduction of the cost of electric lighting or the operation of small motors, for the advantages of cheap power to a community are in no way measured by the insignificant reduction in one's individual electric light bill, but are found in building up within our borders those industries the products of which comprise the most important materials which contribute to our industrial welfare.

KEEPING OUR INDUSTRIES AT HOME.

At such a time as this it is indeed trite to say that the demand for cheap power in the United States has far exceeded the supply. Industry after industry has been driven to Canada or to Norway. The exodus began ten years ago, when the American Cyanamid Company was forced to locate on the Canadian side of Niagara Falls in order to secure power cheaply enough for successful operation. Since that time industries by the score, utilizing hundreds of thousands of horsepower—industries conceived by Americans, operated by Americans and owned by Americans—have located in the frozen North on the rugged cliffs of the Norway coast, where cheap power is available, but many of the raw materials must be shipped great distances, and others have been exiled to Canadian sites such as the Shawinigan Falls on St. Marys River in the Province of Quebec. With the advent of the Muscle Shoals power, it is confidently expected that our country will be able to supply to its own industries those favorable commercial conditions for operation which are now available only outside of our borders.

Located in the protected inland section, favored in transportation facilities by rail and river, and possessing the advantage of an abundance of negro labor, the Muscle Shoals section of the Appalachian South, with the development of its electric power, will offer advantages to the manufacturer unsurpassed in our country.

Extensive Southern Resources for Electrochemical and Electrometallurgical Industries

By H. D. RUM, Treasurer, United Oil and Chemical Corporation and Manager, Chemical Department, Marden, Orth & Hastings Corporation.

It is particularly gratifying to me to have been given the opportunity to sketch in a general way in your issue of September, 1916, something of the "Electrochemical and Electrometallurgical Outlook in the South," if for no other reason than to be able to say "I told you so" when the American Electrochemical Society shall, after its April trip through that favored section, be trying to comprehend those vast possibilities becoming each day so much more probabilities and in so many cases actual realities.

The central features are, of course, the nitrate plant and power development at Muscle Shoals and the hundred-million-dollar smokeless powder plant at Nashville.

The electrolytic developments at Canton, N. C., and Kingsport, Tenn., the electrometallurgical developments at Chattanooga and Birmingham and the dyestuff and chemical manufacturing plants of Kingsport, Knoxville, Nashville and other points, but mark the footsteps of pioneers along the road soon to be trodden by the mighty host of Capital and Labor hand in hand on their march to develop the wonderful storehouse of the old South.

Thus will be attained the development of all the raw materials to produce the munitions needed to enable us to properly back up our Allies in the World War until we can go with them all the way and, spending if necessary to the uttermost, finally annihilate the Monster of Berlin, and so prevent its spread-

ing over the rest of the world that hateful grip through military oppression, which since 1848 has gradually choked the Germany of Goethe and Schiller into that pitiable condition which makes every American descendant of German ancestors hang his head in shame.

The chemicals thus produced, after hard-fought war shall once more have won to us smiling peace, will furnish the fertilizers necessary to enable the world's exhausted fields to feed the world's hungry peoples and the metallurgical products will again push on the framework of our industrial life, looming ever more and more gigantic.

To attempt to specify details will be a work of supererogation to those of your readers who are making the trip in question and put a strain on the credulity and comprehension of those so unfortunate as never to have passed with an admiring and observant eye through beautiful Dixie.

When more of the electrochemists and electrometallurgists of the country have learned of the possibilities of electric power, coal, iron, phosphate, barytes, lauxite, manganese, salt, lime, graphite, potash, silica, magnesium, all existing together in the center of the world's greatest market for all the products thereof, in a country so fair and beautiful, with a climate so salubrious, it will be a safe bet that in a few years the United States census of people interested in that sort of thing may almost be taken in that section.

Over \$150,000,000 to Be Expended in Muscle Shoals District for Four Nitrate Plants and Dams

By THOMAS F. LOGAN, Washington, D. C.

"Of such vast benefit to the whole country that the possibilities of the project are scarcely within the scope of one's imagination."

It was thus that Senator Bankhead of Alabama recently described the plan under which the Government has begun to develop an enormous water-power at Muscle Shoals, in the Tennessee River, and to erect four or more great nitrate plants at or near the Shoals in Northwestern Alabama and Southern Tennessee. The total expenditure will exceed \$100,000,000.

No less than 600,000 horse-power will eventually be developed at the Shoals, or more than all the power that can be obtained from Niagara Falls on both the American and the Canadian sides of the Niagara River.

And the value as fertilizer of the nitrate to be produced would be such—not to mention its actually incalculable value as a war supply—that, according to an estimate made by Senator Underwood of Alabama, the farmers of the United States would save, on the basis of the 1914 consumption, almost \$78,000,000 a year merely through the reduction in their fertilizer bills.

For war purposes, on the other hand, the need of nitrate on the part of any modern belligerent is scarcely less important than the need of air or of water. "In its ultimate analysis," says Dr. Thomas H. Norton of Washington, "a modern war is reduced to the simple term of nitric acid. The nation engaged in a struggle for life and death becomes helpless the day this nitric acid is exhausted, no matter what its population may number, no matter what their bravery, skill and resoluteness."

Yet until one of the Muscle Shoals plants begins to produce nitrate the United States will remain dependent for any considerable supply of nitric acid, as it has been dependent for many years upon importations of sodium nitrate from Chile.

Thus the Muscle Shoals project is really a double undertaking—a plan of immense value for purposes of peace and a plan of even greater value for purposes of war.

Moreover, the project again divides itself clearly into a plan for the present and a plan for the future. The future plan, or, to be more exact, the future results of that plan, have to do with the water-power and the nitrate plants. But the present plan, meaning the results to be obtained soon, have to do with the nitrate plants and with certain steam-power plants that are being constructed for use more or less temporary.

Because the dams and other river improvements necessary for the creation of water-power at Muscle Shoals will probably not be completed within the next three years, and unless the war is to last longer than most authorities expect, the water-power should be viewed as a peace project and a project for post-bellum years to come—a project, in other words, of vast future importance to the agricultural resources of all the country and to numerous other interests in the South and Middle West.

The improvements of the river confer, in fact, a very notable benefit that lies wholly apart from the creation of the water-power. Simultaneously with the building of the water-power plant dams will be constructed that will permanently remove from the path of navigators "the obstruction, which, like a cork in the neck of a bottle," stops up commerce along a stretch of 404 miles of the Tennessee River itself in the States of Alabama and Tennessee, and along 277 miles of tributaries to the same river within the two States. The Tennessee

River, now navigable for 248 miles, from its mouth to the Shoals, would then be open to steamers of fair draft as far eastward as Knoxville, Tenn.

This notable addition to the cheap transportation of freight will open up deposits of marble, zinc, lead, coal, iron, and bring much timber into market. When one contemplates even the minimum results from the improvement in navigation, from the establishment of a prodigious water-power with all its industrial potentialities, and from the various nitrate plants so fecund in their stimulation for the agriculture of the nation, it is easy to understand why "Muscle Shoals" has already become synonymous prospectively with the greatest industrial center in the South and the greatest public work in the United States.

For more than a hundred years the need of improving the navigation of the Tennessee River has been evident, in view of its length and depth and because of the agricultural, industrial and commercial richness of the country it traverses. From the head of navigation at Knoxville, Eastern Tennessee, the river flows southwestward past Chattanooga, Tenn.; westward near Huntsville, past Decatur, Florence and Sheffield, all in Alabama; and northward, through Western Tennessee and Kentucky, to a junction with the Ohio River at Paducah, Ky., a short distance east of Cairo, Ill., and the Mississippi. This navigable length, were the obstructions removed for a distance of some 35 miles along Muscle Shoals, would be 652 miles, or more than the railroad route between New York City and Columbus, Ohio.

In the Knoxville district, where the river passes Rockwood, Kingston and Harriman, an extremely fertile valley is drained by the Tennessee and its affluents, the French Broad, the Clinch, the Hiwassee, the Holston and the Little Tennessee rivers. Here the betterment of navigation along the main stream would not only benefit agriculture, but would also release great mineral and timber sources. On the Little Tennessee are valuable mines directly tributary to the river, especially certain slate mines, and the hardwood-timber area drained by the same tributary is noted for its wide extent and its superior products. Were navigation to be permanently improved, the five tributaries would tap surprising resources of bauxite (from which aluminum is extracted), marble, zinc, copper, iron and coal.

As the strategic location of Chattanooga was recognized during the Civil War as that of a military gateway to the Southeast, so commercial leaders, since the war, have recognized the strategic location of the city from a commercial viewpoint. Although Chattanooga has thus become one of the acknowledged railroad centers of the country, the just aspirations of Chattanooga commerce will not be realized until the Tennessee River has been opened for year-round navigation from Knoxville to the Ohio. To obtain a direct communication by water with St. Louis, Chicago, Cincinnati, Louisville and Pittsburgh has been the persistent effort of the business interests of Chattanooga for half a century.

Thus Chattanooga men obtained from Congress in 1904 a permit to build a navigation-and-power dam at Hales Bar in what is called the "mountain section" of the river. They themselves enlisted the necessary capital, so that when the dam was completed in 1913, at a cost of \$11,000,000, there had been well-nigh no expenditure on the part of the Federal Government. This

achievement has given to Chattanooga slack-water navigation for a distance of 40 miles. Hence, inasmuch as the impediments in the "mountain section" had been among the most serious obstructions to commerce, the city that removed these obstructions at private cost naturally contends that the nation has thereby been obligated all the more to get rid of the remaining obstructions along the Muscle Shoals.

Moved by these considerations, the board of engineers after prolonged inquiry into the possibilities of the Shoals region recommended, in 1914, that three dams be constructed, so that the improvement of navigation and the creation of water power would mutually recompense each other.

Dam No. 1, for navigation only, would be located between Sheffield and Florence, and would be comparatively small.

Dam No. 2, just east of Florence, and Dam No. 3, about 15 miles farther east, would be primarily power dams.

The three dams, when completed, would furnish slack water navigation for nearly 100 miles along the Tennessee, and would improve for traffic two tributaries—the Elk River for 30 miles and Shoal Creek for 20 miles; the total improvement to be distributed along a distance of 150 miles.

In conjunction with this proposal, the Army engineers also outlined a plan for removing the Shoals impediment to navigation without creating a water-power. Indeed, this second plan would prevent the development of water-power. It was suggested that the old Muscle Shoals Canal be widened and deepened; that its entrances be improved; that one dam be built; and that a stretch of the river be dredged between Brown's Island and Flint River.

But the report explained that the first, or lock-and-dam plan, although it would cost more in the beginning, would provide a water-power of great and lasting value in addition to affording good navigation. Besides, the annual operating cost would be less than half of the cost of operating the second project, and would even be decidedly less than the average annual cost of operating the old canal during the previous 14 years.

However, the manifest possibility that a highly valuable power-plant might be established at the Shoals at the same time navigation was improved, and that both ends could be gained partly through the same means, had long influenced everyone interested in river improvements at this point.

About the year that the War Department began its extensive survey through a board of engineers the Alabama Power Company tried to form a partnership with the Federal Government for the purpose of developing power through the construction of a dam across the Shoals. Despite the engineers' report—which has already been detailed—to the effect that ample power could be developed, the company and the Government could not reach a satisfactory agreement.

But when the United States entered the European War and the need became apparent for a large, unfailing domestic supply of nitrates to be used in making explosives, suggestions naturally arose that the plants, requiring, as they do, a great amount of power, should be placed at or near Muscle Shoals for the following reasons:

The plants would have to be located at some point far in the interior because, being all-essential to the conduct of war, they could not be exposed to the attacks of an enemy. This condition has been laid down rigidly by the General Staff of the Army.

Next, because nitrate is hardly of less value to the farmers in time of peace than it is to the army in time of war, these plants should be fixed where, in deference to the interests of agriculture, they could be operated after the war at the lowest possible cost. This meant that they must, as soon as possible, be operated by water-power, and that such power should be both unfailing and extremely large. If small water-powers were to be used, the plants would be small and scattered, and the price of the product would be necessarily higher.

To perfect the product of the plants, an abundance of coal, limestone and phosphate rock, such as exist near Muscle Shoals, should be found in the vicinity.

The climatic and the labor conditions should be favorable.

With a view to cheapness of distribution the nitrate should be provided at some point central to the agricultural districts of the country.

Exercising the authority granted by Congress, the President decided, in accord with the facts, that the nitrate plants should be constructed at and near Muscle Shoals. To this end he issued, on the 25th of last February, an order directing the War Department to carry out his intentions. Quite naturally he also directed that the Department should follow the plan submitted by the army engineers in 1914, for improving navigation and establishing a water-power through the construction of three dams at the Shoals.

However, he limited the river work to the construction of Dam No. 2, the first of the two dams intended both to improve navigation and to provide water power. He also ordered the erection of two nitrate factories, although the building of two more factories in the same district has since been planned.

This Dam No. 2 has already made good progress. It is to be 104 feet high and 4500 feet, or nearly a mile, long. It will have three locks, with a total lift of 93.5 feet. It will flood a net area of 9025 acres. It will provide an initial electric current, when the work is completed three to five years hence, of 150,000 horse-power. Ultimately this current will be raised to 480,000 horse-power. For the dam and the connected power-house \$13,200,000 will be set aside out of the \$20,000,000 appropriated for nitrate plants and their accessories. The dam site, which, with much adjoining land, had been acquired by the Alabama Power Company, has been donated to the Government. All the lands that will be overflowed because of the erection of the dam—except one tract of 150 acres—were either donated or "optioned" at reasonable prices satisfactory to the Government.

Although sufficient power to operate the new nitrate factories during the present war will be obtained from steam plants, the whole lock-and-dam

project at Muscle Shoals and the vicinity will eventually be carried out. That is, Dam No. 1, to improve navigation, will be built, as well as the second power dam, No. 3. It has also been mentioned that the ultimate power development, as planned by the board of engineers, includes the reinforcement of the Muscle Shoals power plants with electric current to be conveyed by cable from hydro-electric plants on the Little River in Northeastern Alabama, 100 miles away, and from a similar plant about 170 miles southeast of the Shoals—that is, on the Tallapoosa River at Cherokee Bluffs, a short distance northeast of Montgomery, Ala. There is no available storage for water at the Shoals. But at the Little River 4,800,000,000 cubic feet of water can be stored, and at the Tallapoosa 50,000,000,000 feet may be kept in reserve. During the wet season the maximum power would be gained at the Shoals and none would be brought in from outside. But during the dry season—that is, from the latter part of June to the middle of December—the maximum output of electric energy would be assured by tapping the reservoirs for the plants at Cherokee Bluffs and on the Little River. These calculations have been worked out on the basis of the calculated annual water flow during 40 consecutive years.

Dam No. 3 at the Shoals would have a single lock with a 28-foot lift and would be 6425 feet, or considerably more than a mile long at the crest. The initial energy created would be 60,000 horse-power, and the ultimate result would be 180,000 horse-power. Twenty-five thousand four hundred and seventy acres would be flooded by this dam.

Perhaps a more fitting comprehension of the Muscle Shoals power plant as a genuinely colossal undertaking may be gained from comparisons with water powers already famous. That at Keokuk, Iowa, on the Mississippi, which transmits electricity to St. Louis and other cities, produces 300,000 horse-power, the "ultimate installation." Developments at Niagara Falls during 28 years have evolved 475,000 horse-power on both the American and the Canadian shores combined. But the energy to be finally attained at Muscle Shoals will be 600,000 horse-power.

Again, the largest dam in the world is the Kensico dam, erected as part of the construction needed to give the City of New York a new and large source of water supply. The Kensico dam contains 1,000,000 cubic feet of masonry. Muscle Shoals Dam No. 2, work upon which has already started, will contain 1,200,000 feet of masonry.

Then the most celebrated dam in the world is doubtless the Assuan Dam, on the River Nile; tourists travel far to view this structure, and, though it merely conserves water and produces no power, it arouses justifiable pride in the bosoms of British subjects. Yet Dam No. 2 at Muscle Shoals will be higher than the Assuan dam and will contain more masonry. Besides, Dam No. 3 at the Shoals will even exceed in length the Assuan dam—6425 instead of 6400 feet, and will be expected to display an equal resistance to the onrush of "mighty waters." For the maximum recorded flood of the Nile at Assuan is 494,500 cubic feet per second, and the maximum recorded flood of the Tennessee at Muscle Shoals is 500,000 feet per second.

Most Americans will best realize the greatness of the task undertaken at Muscle Shoals when they are informed that, in width and depth, the Tennessee River at the Shoals might be compared approximately to the Ohio River at Cincinnati.

The cost of this extraordinary water power was, of course, estimated in detail by the Army engineers. But prices of materials and of labor, together with the conditions of construction, have so radically changed since 1914, because of the war, that pre-war estimates are no longer worth quoting. Later estimates, though still vague and general, indicate that the final sum of expenditure on account of the three dams and the first three nitrate plants, not to speak of a fourth plant already located in the same district, will range from \$100,000,000 to \$125,000,000.

In accordance, therefore, with the provisions of the National Defense Act approved June 3, 1916, as those provisions were made effective through the President's order of February 25, 1918, four nitrate plants have already been definitely planned at or near Muscle Shoals. Work upon two of them at least has already started.

Plant No. 1 has been established at Sheffield, Ala. a short distance below the Shoals. The capacity of this plant will be about 11,000 tons of nitrate annually. Here the nitrogen is to be obtained, by the "synthetic" process, from ammonia and not from air. The process is being developed by the General Chemical Company, which expects to have one unit, or quarter, of the plant completed early this summer, so the unit may be "tested out" in July or August. But some months would then elapse before any nitrates would be produced in commercial quantities.

In connection with Plant No. 1 a steam power plant of about 10,000 horse-power is being constructed.

Plant No. 2 is to be located on the lower dam of the Muscle Shoals project. This plant is being constructed by the Air Nitrates Corporation, formed for this purpose, and the calculations include an estimated annual output of nitrate from this plant of 110,000 tons.

A steam plant that will furnish 60,000 horse-power is under construction for this plant. Besides, the Alabama Power Company will transmit 40,000 horse-power in electric current from the Black Warrior station of the Power Company on the Coosa River 85 miles distant. The combination assures 100,000 horse-power for the use of Plant No. 2 until Dam No. 2 is completed.

Plants 3 and 4 will each be of the same size as No. 2. Plant No. 3, at least, will be essentially a duplicate of Plant No. 2. Each of the three large plants will therefore cost about \$45,000,000.

A survey has been made by the War Department to determine the best location for the additional plants, but the sites chosen have not yet been officially announced. It is said, however, that they are likely to be not far from the Muscle Shoals district.

The South and the Electric Furnace Industries

By F. J. TONE, Works Manager, Carborundum Company, Niagara Falls, N. Y.

"This nation's business is to win the war." The letter-head of the MANUFACTURERS RECORD bears this simple and very forceful caption, and it means that every individual, every set of individuals, every organization and every section of the country must exert its full force to the one end. The war is to be won by men, money, materials and morale, and of these material resources have an importance second to no other. The South is a section of great natural resources, and largely of undeveloped resources. Moreover, they are resources of the highest importance in the arts of metallurgy and chemistry, and their fullest utilization and development at this time is most necessary. In no other section do we find undeveloped water-powers and mineral deposits occurring in such close proximity and offering such an opportunity to assemble raw materials and make the finished product at low cost. If the nation's business is to win the war, we may say that the business of the South is to develop its resources, and at this time, when the American Electrochemical Society is about to get some first-hand knowledge of these resources and learn what they really are, it will be interesting to review some of our large electrochemical developments and their relation to the South.

The aluminum industry is the largest of the electrochemical industries from the point of power consumption and value of product. Its raw material is bauxite, and the South contains the entire deposits of bauxite of the United States, from which is produced 55 per cent. of the entire aluminum metal output of the world. It is only within the last two years, however, that plants have been located in this section. With the construction of the immense plants at Maryville, Tenn., and Badin, N. C., the South at last comes into its own as a big aluminum producer. Aluminum is a most important munition material. Every Liberty motor, every automobile and aeroplane motor requires large quantities in the construction of crank case, pistons and various parts. Aluminum goes into army canteens, camp cooking utensils, acid containers for nitrogen fixation apparatus, the deoxidation of steel, electric transmission lines and aluminothermic welding.

The ferro-alloy industry may be put down as the key industry of steelmaking. Today it is a war industry of tremendous importance, but what is largely forgotten is the fact that it saw its initial development in the South. The first 50 per cent. ferrosilicon was made in the electric furnace by De Chalmot at Holcomb Rocks, Va., and high percentage ferrochrome was also a product of this pioneer plant. On account of the lack of water-power, however, the South failed to retain the industry, and the big development has until recently been centered in the Niagara district.

The manufacture of alloy steel got its first big impetus from the automobile makers, and now the war has more than quadrupled the demand. Everywhere maximum strength is demanded with the minimum of weight. In gun forgings, in soldiers' helmets which deflect a rifle bullet or a fragment of shrapnel, in crankshafts and connecting rods of Liberty motors, in various parts of tractors, auto trucks and aeroplanes, everywhere it is employed for the vital parts of the mechanism. The supply falls far short of the demand, and unquestionably after the war alloy steel will be used more widely than ever before.

In a large part of the 40,000,000 tons of steel made in this country last year ferrosilicon was an absolutely essential ingredient in the deoxidation and refining of the molten steel. Every ton of shrapnel steel requires 60 pounds of ferrosilicon. All steel castings require ferrosilicon for the elimination of blow holes and the production of sound castings. Ferrochrome is an essential element in the manufacture of armor plate and armor-piercing projectiles. Without this alloy not a battleship could be provided with protective armor. It is one of the important constituents of high-speed steel for the cutting of metals. High-speed steel has trebled the capacity of every machine shop and the output of every workman.

Calcium carbide, the source of acetylene, is another product which had its beginning in the South. Willson, the inventor of calcium carbide, operated his

first furnace at Spray, N. C., in the early 90's, but the large scale furnace operations were drawn to Niagara by reason of cheap electric power. At first the chief use of acetylene was in isolated lighting of buildings and towns and in miners' lamps. Now the larger portion of the product goes into the oxy-acetylene cutting and welding of metals. In hundreds of industrial operations it is saving labor and making a big contribution to efficiency. In the steel foundry in cutting sprues from castings one oxy-acetylene flame does the work of 12 men.

The latest triumph of acetylene is in the manufacture of acetone and acetic acid. Acetone is needed in large quantities in the manufacture of explosives, and acetic acid is a prime necessity in the manufacture of dope for aeroplane fabrics. The first plant on this continent to make acetone from acetylene was the Canadian Electro-Products Company at Shawinigan Falls, Quebec, which has had works in operation for the past year. Now, for want of electric power in this country, we see the United States Government going into Canada and erecting a duplicate plant at Shawinigan Falls, under arrangement with an organization to be known as the American Electro-Products Company. Twenty thousand horse-power will be used for the production of the requisite calcium carbide. But this is only a beginning, for acetylene has a long line of organic derivatives, some of them, for example, alcohol, of great industrial importance.

The abrasive industry likewise depends on the bauxite of the South for the production of the electric furnace abrasives, aloxite and alundum. With the curtailment of Niagara power on the American side the major portion of the abrasive industry has gone to Canada. Five-sixths of all the aluminous abrasives used in the United States are now produced in Canada, whereas if a more liberal water-power policy had been in force in the South this industry might have been permanently located within the country.

Artificial abrasives are fundamental elements in the metal-working industries. They are used in the grinding of shrapnel, high explosive shells, rifles, bayonets, gun barrels, shaping of armor plate, all parts of auto trucks and aeroplane engines, locomotives, electrical machinery and throughout the toolrooms and machine shops of the metal-working trades. No other one thing has contributed more to standardized quantity production. It enables metal parts to be turned out by thousands, no piece differing from any other by more than a fraction of a thousandth of an inch. The mechanical perfection of the modern automobile and the interchangeability of its parts have been made possible only by the development of the grinding machine and the grinding wheel. Practically every part of the automobile is ground at some stage of its manufacture. Take away from the aeroplane and automobile industry artificial abrasives, aluminum, alloy steel, high-speed steel and the other products of the electric furnace, and it would cease to exist on its present lines.

The production of graphitized and carbon electrodes is recognized everywhere as a war industry. The shortage has been very acute, and has hampered the expansion of every electric furnace and electrolytic process, all of which depend so absolutely on an adequate electrode supply. Great Britain has on this account entirely forbidden the further installation of electric steel furnaces without Government permit. Electrode plants are now making large extensions, and relief is promised within this year.

But to whatever extent the South may have failed in the past to share in our electrochemical development, there is one field where it would seem that it must soon take first place, and that is in the manufacture of nitrate fertilizers. The Ordnance Department, in connection with the Air Nitrates Corporation, is putting down two plants for the production of air nitrates from cyanamid. They will cost \$30,000,000 each and require 100,000 horse-power. One of these plants is located at Muscle Shoals, Ala. The product for the duration of the war will go into munitions. After the war it will be diverted to fertilizers. In other raw materials for fertilizers the South occupies a unique position. It contains the most important phosphate deposits of the world. It contains the principal sulphur deposits of the United States, besides extensive deposits of pyrites. Its future position in the fertilizer field would seem assured.

New Electrochemical Centres

By J. WOODS BECKMAN, Ph.D., Beckman and Linden Engineering Corporation, San Francisco, Cal.; Vice-President American Electrochemical Society.

There was a time, before the Civil War, when England said we could not spin cotton here because we had not English machinery to do it on. We know now differently.

It was said by the Germans before our present world calamity that it was impossible for us to make dyes, because we had not German coal tar. We know now differently.

There is a tendency in some sections of the East to say that electrochemical industries can not be developed in many parts of the country because these parts of the country lack access to Niagara Falls power. We are very rapidly coming to a stage where this assumption will be disproven. This as the English and the German earlier theories have been so rudely shattered in their time.

There is no question in anyone's mind that has given the matters of electrochemical development and hydro-electric power serious thought that the policy followed as to Niagara Falls is one of economic waste. The power resources of this enormous cataract should be utilized and will be utilized to the advantage of our nation.

Electrochemical products have become so closely allied with our welfare as a nation and as an individual that it would be a calamity of such magnitude that it is incomprehensible if any or all our electrochemical industries were spoiled or their products diverted from our own needs.

It is, therefore, apparent that we cannot put all our eggs into one basket. We cannot afford to have the overwhelming majority of our electrochemical

industries located at Niagara Falls without our having some second line defenses distributed in the rear.

The Government is showing the way. Niagara Falls, with its millions of undeveloped horse-power now wasting their energies, has been passed by and Muscle Shoals has been selected for site for the large Government nitrogen fixation plants. It shows that to the eyes of the Government experts second line defenses are needed.

Niagara Falls will always be, in spite of everything, the electrochemical center of the United States of America, if not of the world, but new centers and isolated plants are bound to grow up, and will grow up quickly, as soon as the different parts of the country realize that hydro-electric power generated in any part of the country can accomplish desired results in spite of its not being derived from the falling waters of the Niagara River.

In Europe, from above the Arctic Circle down to the southern part of France, electrochemical, including electrometallurgical, developments can be found. There are no Niagaras there. Small insignificant falls, sometimes of only a few hundred horse-power, have been developed and a suitable industry has grown up due to it, creating new, small but wholesome industrial communities. Again, larger power developments following the course of a river, as those of southern France along the Rhone Valley, have created enviable electrochemical centers; these, in spite of their remoteness, affect all the electrochemical centers of the world.

It is plain that Europe is not tied to one locality for its electrochemical developments, nor need we be wherever water is seeking a lower level and en-

gineering skill proclaims it feasible to be harnessed at costs that are justifiable, together with a reasonable accessibility to raw materials and markets. There in a general way electrochemical industries should and will be developed in all parts of the United States.

The South has a favored position, especially as to accessibility to Eastern markets, which the western part of the United States lacks. While the South again is not blessed with the enormous water-power resources of the far West—the Pacific coast—where 40 per cent. of the water-power of our country is to be found.

There will be a time, and it may be the present generation will see great numbers of electrochemical industries grow up in all parts of our country, where the industry and the power development from a unit where the development of the power is made for one purpose only, the supplying of energy to one electrochemical industry. To relieve this condition we have to grasp our present opportunity and remember that it is a proportionately equally great economic waste permitting small water-powers going to waste as letting the Niagara power go undeveloped, and that electrochemical industries located at our most vulnerable spot is a national danger not to be overlooked, and for this reason the electrochemical industries need a second line of defense all through the country.

There is a danger for new developments to become disheartened even before they are under way by realizing that they are infinitely insignificant compared to the old well-established undertakings at Niagara Falls, but these were small before they ever were big, and so it has to be everywhere with all new undertakings and should only serve as an additional incentive.

Electrochemical Industries and the War

By G. A. ROUSH, Assistant Professor of Metallurgy, Lehigh University; Assistant Secretary American Electrochemical Society.

Electrochemistry has been defined as the art of applying electrical energy to facilitating the work of the chemist. An electrochemical industry, then, would be one in which electrical energy is used to facilitate the carrying on of some chemical reaction on a commercial scale. This may be accomplished in one of three ways—by electrolytic action, by electrothermal action or by the discharge of electricity through gases. And by such means we have not only facilitated the carrying on of some of the most difficult and costly chemical reactions, but we have also supplanted many of these by simpler and more direct methods, and in many cases have developed entirely new reactions and products that could not otherwise be obtained.

Electrochemical processes differ from chemical process mainly in the following respects:

- (1). The energy required by the reaction is supplied by electrical energy instead of by heat.
- (2). When heat is used, as in high-temperature reactions, the heat is generated directly in the charge from electrical energy without complications due to combustion of fuels or to flue gases.
- (3). As a result of (1) and (2), the products are usually purer.
- (4). The apparatus is usually less complicated and the process more direct than the corresponding chemical processes.
- (5). The wear and tear on the plant is usually less.

Electrochemical developments have been rapid in the last 25 years, and as a result of this progress the successful prosecution of the war is largely dependent on the electrochemical industries, for many of the electrochemical products figure directly or indirectly as war materials. The developments started with the installations at Niagara Falls in 1894, and while Niagara still remains the foremost electrochemical center of the country, electrochemical industries of one kind and another are to be found in all corners of the country.

Copper.—Foremost in the list of electrochemical products for war uses is copper. The production of the electrolytic copper refineries of this country in 1917 is estimated at 2,350,000,000 pounds, while the production of copper available for use without electrolytic refining was only about one-eighth of this amount. That a large portion of this metal is in direct demand for war purposes is evidenced by the fact that the production in this country has increased about 50 per cent. since the opening of the war.

The larger part of the copper is reduced to the metallic condition by a smelting operation, and the resulting impure metal is then subjected to electrolytic refining, but during the last few years constantly increasing quantities of pure copper have been produced by hydro-electric methods, in which the copper is leached out of the ore, either with or without roasting, as the condition of the ore may require, and the metal is then precipitated from the solution by electrolysis, so that a pure refined metal is obtained in the primary operation. In this way the electrolytic methods are making rapid inroads on the old pyrometallurgical processes.

Aluminium.—All of the aluminium produced for commercial use is made by electrolytic methods, the process consisting of the electrolysis of a solution of pure alumina, Al_2O_3 , in fused cryolite, $AlF_3 \cdot 3NaF$. The United States and Canada together, using alumina produced entirely in the United States, now produce about two-thirds of the world's supply of aluminium, and the production since the opening of the war has just about doubled. Enormous quantities of aluminium are required for war purposes, the principal items of consumption

being in airplane construction, in utensils for personal equipment and in the explosive ammonal, a mixture of powdered aluminium and ammonium nitrate.

The South is particularly interested in this industry, as a result of the recent developments in the plants at Badin, N. C., and at Maryville, Tenn. The South is also interested in the aluminium question from the standpoint of the ore producer, the States of Alabama, Georgia and Tennessee being heavy producers of bauxite. It happens, however, that most of the bauxite produced in these States goes into the manufacture of aluminium salts, for chemical purposes, while nearly all the bauxite for reduction to metal is drawn from the Arkansas field.

Steel.—One of the most striking electrochemical developments incident to the war is the phenomenal rise of electric steel.

Year.	Electric Steel		Electric Furnaces in Operation.		
	Produced in U. S.	U. S.	Canada.	World.	
1913.....	30,180 tons	19	3	140	
1914.....	24,000	41	2	213	
1915.....	69,412	73	8	303	
1916.....	168,918	136	19	471	
1917.....	750,000 (est.)	233	36	733 (est.)	

Just before the war the electric steel industry was developing only slowly, and that against considerable opposition, but the enormous demand for high-grade steel castings for munitions work has led to practically a 100 per cent. increase over the preceding year every year since the opening of the war.

In this development the South has naturally had its share, since it has the necessary supply of cheap power available to the steel industries of the Birmingham district.

Ferro-alloys.—Of even more importance than electric steel is the production of ferro-alloys. Practically all of these except ferromanganese are made in the electric furnace, and a constantly increasing proportion of the ferromanganese is being made in the electric furnace, rather than by the older blast-furnace process. These ferro-alloys, especially ferromanganese, silicon and ferrosilicon, ferrochrome, ferromanganese, ferrovanadium, ferrotitanium and ferrotungsten, are of prime importance in the production of high-grade steel, either as deoxidizers in the manufacture of the steel, or as an addition material in the manufacture of an alloy steel. Indeed, without these alloys it would be impossible to enter the war, for while they as such do not appear at the front, they form one of the most important single classes of material entering into munition work. The South is particularly well equipped in the manufacture of ferro-alloys.

Zinc.—The demand for high-grade zinc for cartridge brass early in the war put a big premium on the purity of zinc and gave a big impetus to the development of electrolytic zinc. There is only one locality in the country that produces ore of sufficiently high quality to make the best grade of zinc by the ordinary retort process. With the electrolytic process, operating along the same lines as those already outlined for the direct production of copper, the best grade of zinc can be produced from lower-grade ores. This process has now been developed to a point where several hundred tons of electrolytic zinc are made per day. It still remains to be seen whether these processes can live on the price to which zinc will recede after the war demand is over. It is almost certain, however, that by that time at least some of the producers will have the costs of their process

eat down to a point where they can compete with the retort process, not only for high-grade zinc, but probably also for ordinary spelter.

Chlorine.—The electrolytic product of which most has been heard from the front is chlorine. This was the main constituent of the first poison gases used in the trenches, and it is still used in enormous quantities. In addition to the other gases more recently developed for this purpose, thousands of tons of chlorine have been used, the statement having been made recently by an officer returned from the front that in some of the gas attacks the gas tanks in the trenches were only two feet apart, and hundreds of tons have been used in a single attack.

The use of chlorine for sanitary purposes in the camps is, however, probably of much more importance than its trench use. Its use both as chlorine and as hypochlorite in general camp sanitation and its use in the purification of water supplies make it indispensable.

Chlorates.—Directly connected with chlorine are the electrolytically prepared chlorates. These are used in munition work, particularly for detonators, and as such are practically the foundation of munition work, for no matter how good a shell may be otherwise, it is worthless without a good detonator.

Hydrogen and Oxygen.—The electrolysis of water for the production of hydrogen and oxygen is of immense importance in carrying on the war, not so much in this country as directly at the front. The hydrogen is used in the military balloons, and the oxygen used with either hydrogen, coal gas or acetylene for the welding and cutting of metals.

The acetylene for this purpose is indirectly an electrochemical product, being made from calcium carbide, one of the oldest of the commercial electrochemical products.

Acetone and Acetic Acid.—There has been a great deal of development in the synthesis of organic chemicals by electrolysis within the last five years, but while most of it has been as a result of the war, in order to replace chemicals that are no longer imported, very little of it is of direct use in the war. Probably the most important work, from a munitions standpoint, is that on acetone and acetic acid. Large amounts of these chemicals are needed for airplane work, and in one of the Canadian electrochemical plants a process was developed for the electrolytic oxidation of acetylene to acetone. This process was used for some time, but after the installation of the large distillation plant at Baltimore acetone could be made there more cheaply than by electrolysis, and the electrolytic process was modified to carry the oxidation on to acetic acid, and the plant is now producing glacial acetic acid.

Abrasives.—Another electrochemical product that never reaches the front, but still is of prime importance behind the lines, is artificial abrasives. Silicon carbide, as carborundum, crystolon, exolon, etc., and artificially fused alumina, as alundum, aloxite, etc., rank in the production of the finished steel as do the ferro-alloys in the production of the raw steel.

Calcium Carbide.—The earliest of the large electric furnace industries to be established was the manufacture of calcium carbide, about 25 years ago. From a war standpoint, calcium carbide as such is of small interest. It is available for the generation of acetylene as an illuminant, for cutting and welding work, and as a raw material for oxidation to acetone or acetic acid; it is also coming into use to a limited extent as a deoxidizer for steel, but its most important use is as a raw material for the fixation of atmospheric nitrogen by the cyanamid process.

Nitrogen Fixation.—The one electrochemical development that is of greatest interest in the South today is probably the fixation of atmospheric nitrogen, on account of the establishment of the Government plants at Muscle Shoals, Ala.

The commercial application of the fixation of nitrogen covers a period of only

about 15 years, and of the multitude of processes that have been devised to serve this purpose, only the Birkeland and Eyde and the Schönherl modifications of the arc process and the cyanamid process have been tried out on a commercial scale, unless Germany has been able, since the beginning of the war, to commercialize work that was then in the experimental stage, on the direct synthesis of ammonia from nitrogen and hydrogen. A modification of this process, which is chemical, rather than electrochemical, has been worked out in this country and a plant is now under construction at Muscle Shoals, Ala., for operation under Government control in conjunction with a second plant operating the cyanamid process.

The arc processes are entirely electrochemical, and the cyanamid process is indirectly electrochemical, in that its chief raw material is calcium carbide, an electrochemical product. And from a commercial standpoint the cyanamid process is the more important of the two, since it produces more fixed nitrogen than the arc processes. And, in fact, on a war basis it is the only process up to the present in use by the Allies, for both of the arc processes were developed in Norway by German capital and so are available for German use. It is evident, too, that enormous developments have been made in Germany itself along these lines, for the known amounts of Chilean nitrates held in storage in Germany before the war would have long been exhausted and she would have been left helpless for nitric acid for high explosives had it not been for her developments in the fixation of atmospheric nitrogen.

The imports of sodium nitrate into the United States for the last five years have been as follows:

1913.....	636,293 long tons.
1914.....	552,777 " "
1915.....	772,190 " "
1916.....	1,218,423 " "
1917.....	1,575,839 " "

The 1917 imports are equivalent to about 250,000 tons of combined nitrogen, while the world's capacity for the fixation of atmospheric nitrogen before the war was only about 100,000 tons. As this country has been called on more and more heavily to furnish munitions, the imports of nitrate have necessarily increased until the rate of import now is about three times the rate at the outset of the war. The enormous tonnage of ships at present demanded for carrying this material is seriously needed for transatlantic service for our own expeditionary forces. The erection of the Government plants for nitrogen fixation is to serve the double purpose of cutting down the tonnage necessary for the importation of nitrates and at the same time bring the production of a large portion of our needs in fixed nitrogen close at home, where it is not subject to the delays and perils of transportation.

Other Industries.—This list does not by any means cover all of the electrochemical industries that feature in one way or another in the war program, but only those that are most directly connected with the problem of winning the war. A large number of other industries, such as the electric furnace production of graphite, the electrolytic refining of gold, silver, lead and nickel, electroplating and electrotyping, the electrolytic production of sodium and caustic, the electric furnace production of phosphorus and carbon bisulfid are in their own particular field of just as much importance as these others, but they do not happen to stand out quite so directly as do the others as a part of the answer to that ever-present question, "How to win the war?"

Electrochemistry in the Machine Shop

By C. G. SCHLUEDERBERG, Westinghouse Electric and Manufacturing Company, Chairman, Membership Committee American Electrochemical Society.

In the popular mind, that there should be any connection between electrochemistry and the average machine shop, is so remote a possibility as to scarcely receive consideration.

In the booth of the American Electrochemical Society at the Second National Exposition of Chemical Industries held in the Grand Central Palace, New York, during the early fall of 1916, there was exhibited an automobile chassis showing the relation of electrochemistry and electric furnaces, to the various parts of an automobile. Large size placards were placed on the walls of the booth and each placard was connected by ribbons of a certain color with the various parts of the automobile to which the designation on that particular placard applied.

For instance, one placard read Chrome Vanadium Steel and was connected with those portions of the mechanism which involved the use of such material.

Another placard read Electrolytically Purified Copper and was fittingly connected to the electric wiring, gaskets and other copper used about the machine.

Another placard covering ferrosilicon steel was, of course, connected to the springs.

However, the placard covering artificial abrasives had attached to it almost as many ribbons as all the other placards combined. It dominated the entire situation as every bearing, every finished surface and in fact every part of the automobile where two metals were in movable contact, had been accurately finished by grinders to within the one-thousandth part of an inch "by use of artificial abrasives prepared in the electric furnace."

This exhibit, in a measure at least, brought home to the popular mind the tremendous application of abrasives in modern machine work. What is true of automobiles is, of course, true of all other machine products of the present day, especially rifles, machine guns, shells and other munitions of war. All these must be finished with extreme accuracy necessitating the use of large quantities of abrasives.

It is an established fact that were it not for artificial abrasives, which, by the way, are prepared entirely in the electric furnace, the present output of automobiles, trucks and other machine products would not be one-fifth of that which now obtains.

Realizing the absolute dependency of our fighting forces in the present war on machine guns, trucks, airplanes, and all other products of the machine shop, it is readily conceivable that our success in this war will be at least in a measure due to our ability to produce abrasives artificially by electrothermal means. The relation between electrochemistry and the average machine shop is therefore of the very closest nature; for the production of natural abrasives is so small in comparison that the production of artificial abrasives as to be almost negligible.

Coupled with the use of high speed cutting tools made from alloy steel derived largely from the electric furnace and with the use of similar steel for machine parts where great strength or resistivity is required this is simply another instance of how modern scientific achievements have gradually worked their way into our every-day lives without our being aware of the fact.



BY-PRODUCTS PLANT AT FAIRFIELD (BIRMINGHAM), ALABAMA

The Field for Chemical Industries

The South has been favored by nature in a wealth of resources of great industrial value. Today would seem to be the South's day in industrial development, for the growing importance of the chemical industries is creating a demand for resources and conditions which are found in the South as in no other section of the United States.

This is especially true of that portion of the South known as the Southern Appalachian region, and which extends from Virginia southwest to Northern Georgia and Northern Alabama, and takes in the northeast corner of Mississippi. The tracks of the Southern Railway System cover nearly every part of this region. Main and branch lines traverse it in every direction, giving the most direct communications to all sections of the country, and for large areas, where are found the most valuable mineral and other resources, providing the only railroad facilities.

GREAT POWER RESOURCES

The chief requirements for a large number of industries, especially chemical industries, is abundant, reliable and low cost power. In power resources, developed and undeveloped, the sections of the Southern States lying in or immediately adjacent to the Appalachian regions afford the greatest facilities. The streams which have their headwaters in the mountains and flowing to the Atlantic, the Gulf and the Mississippi have already been developed until there is in the South three times the amount of hydro-electric power furnished by Niagara Falls, while probably only one-third the possibilities have been improved. The developed power and those in process of development will readily furnish the power for a large number of new hydro-electric industries. While numbers of the undeveloped powers are held for future development by companies already in business, there is a wealth of power, in some cases of large capacity, which can still be secured by manufacturers or power corporations for development, in the territory served by the Southern Railway System.

The coal areas of Virginia, Kentucky, Tennessee, Alabama and Georgia contain extensive deposits of good steam and coking coals, and the supply is sufficient to last for hundreds of years. In connection with the hydro-electric power developments there is an extensive use of steam auxiliary plants. The Southern Railway System tracks serve five different coal fields. The operation of by-products coking plants will add much to the available power of the South. In the Southern Railway territory are low-sulphur coals which will average about 2 per cent. nitrogen.

The Southern Appalachian region has not been fully explored. Every year exploration and intelligent investigations by competent men are discovering new deposits of minerals which already are or will be important factors in the chemical industries. The known deposits, however, coupled with the great available power, give opportunity for the establishment of industries which cannot only be operated at low cost, but which will have distinct advantages in the standard of their product.

PURITY OF RAW MATERIALS

High standards for commercial chemicals are generally based on purity of raw materials.

Here are some of the materials which may be found in this Southern Appalachian region at points along or adjacent to lines of the Southern Railway System:

- Limestone that will uniformly average about 99 per cent. Ca Co_3 .
- Dolomite that will average 54.14 per cent. Ca Co_3 and 45.22 per cent. Mg Co_3 .
- Glass sands near coal fields that will carry better than 99 per cent. Si O_2 .
- Barite that will uniformly yield more than 98 per cent. Ba So_4 .
- Bauxite, low in iron, more than 60 per cent. $\text{Al}_2 \text{O}_3$ and less than 10 per cent. Si O_2 .
- Manganese better than 50 per cent. Mn O_2 , less than 1 per cent. $\text{Fe}_2 \text{O}_3$, and less than 2 per cent. silica.

Finely divided silica 200 mesh screen in natural state, iron free and better than 98 per cent. Si O_2 .

Rutile in quantity, average more than 98 per cent. Ti O_2 .

Pyrite, average better than 48 per cent. sulphur.

Low sulphur coals that will average about 2 per cent. nitrogen.

High refractory materials.

The purest waters in America for chemical use.

Pure limestones of the South are found in the valley of Virginia, East Tennessee, North Georgia, Alabama, Kentucky, and in North and South Carolina. The deposits are near the railroad lines.

Very pure white glass sand occurs at a number of places in South Carolina, Georgia, Alabama, Mississippi and Tennessee.

A large percentage of the barite mined in the United States is from deposits along the Southern Railway System in Tennessee, North Carolina, South Carolina, Virginia and Alabama, outside some that is mined in Missouri. Two of the largest plants in the country making barium compounds are in East Tennessee, on the Southern Railway System.

Commercial deposits of bauxite are found in Georgia, Tennessee and Alabama.

The most of all the manganese produced in the United States has been mined in Virginia, Georgia and Tennessee. Many new manganese mines are now producing along the Southern Railway System, and there are still some good properties which warrant development.

The more important rutile area in the United States, and probably the largest in the world, is in Nelson County, Virginia.

Nearly half the pyrite produced in the United States comes from Virginia and Georgia. There are important deposits yet to be developed in Virginia, Georgia and Alabama.

A PRACTICAL, HELPFUL SERVICE

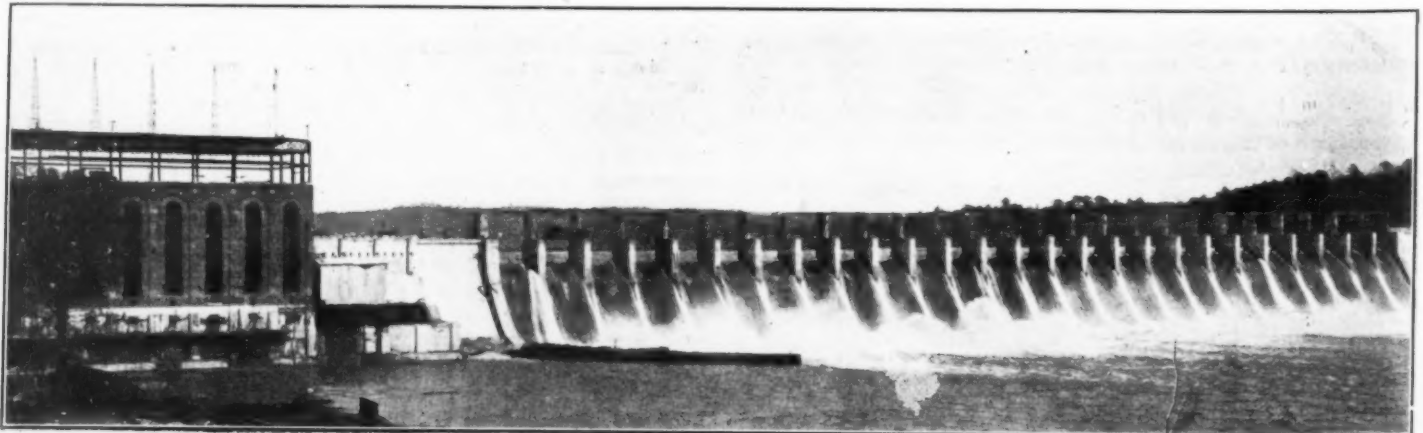
The Development Service of the Southern Railway System has information about the resources of the South which should prove of great value to the engineer or the corporation which has a chemical industry to locate. This information is the fruit of many years of study and investigation. It is constantly making new investigations in the territory it serves of mineral deposits, water-powers and other resources and everything that bears on industrial development. When called on, it is prepared, through its own representatives, to make or to assist in special investigation bearing on the location of particular industries.

Engineers or others who have industries to locate and who are looking to the South can save much time and trouble by availing themselves of the information and experience at the command of the Development Service, which is organized and maintained to give them the best possible service throughout a territory covering the parts of the South richest in the resources awaiting use or development and reached by 10,000 miles of Southern Railway System track.

If what you are looking for is in the South, we probably know about it, and we are prepared to point out to you advantageous locations where you can assemble your materials at cheapest cost, where you can secure power and from which products may be distributed to advantage to any part of the United States.

The resources of the South of use in the chemical industries are coming more and more into demand. The man or corporation who begins early investigations will be able to secure to the best advantage his supply of raw material and his location.

Inquiries addressed to the Development Service, W. C. Olds, General Industrial Agent, Room 52, Southern Railway System, Washington, D. C., will receive prompt and confidential attention.



LOCK 12, ALABAMA POWER COMPANY

Knoxville, Tenn., and the Knoxville District

REGION ABOUNDS IN GREAT NATURAL RESOURCES, INCLUDING IMMENSE WATER POWER POSSIBILITIES

By HENRY KNOX WARD.



NOXVILLE, Tennessee, is a "City which hath foundations," and it is located in the center of a territory that is bountifully supplied with natural resources.

NATURAL RESOURCES.

Nature has endowed the city and vicinity with unsurpassed wealth in mine, field, forest, climate and topography. The natural resources, together with the situation and environment of the city, must inevitably attract within its gates an increasing number of industrious, contented and happy people.

CLIMATE.

Knoxville is located in the center of a valley 60 miles to 100 miles wide and 250 miles long. Both sides of this valley are protected with rugged mountains, which shield it from the blizzards and chilly winds of the Northwest and Northeast and the hot winds from the South Atlantic and Gulf coasts. The protecting mountains therefore give to the Eastern Tennessee Valley a mild and delightful climate in winter, while the surrounding high altitudes originate descending currents of cool air that contribute to the delightful, medium temperature enjoyed by the same valley during the summer. Thus the climate of Knoxville throughout the year is ideal for health and labor.

POPULATION

Knoxville has within its own area a population of 76,760 people (Military Draft Census, June 5, 1917). The City with its suburbs (including the population of adjacent suburbs that are served by the city street car lines) has a population of 94,289 people (1917 City Directory). The Government census of 1910 shows that within a circumscribed radius of 500 miles from Knoxville there reside nearly one-half the population of the United States.

BUSINESS PURSUITS

At present the chief business pursuits of Knoxville and the contiguous territory are merchandising, manufacturing, agriculture, lumbering, mining and quarrying. Its mining and mineral interests include aluminum, barite, bauxite, coal, copper, iron, manganese, marble and zinc. Its manufacturing is diversified and includes cotton, iron, lumber, marble and allied industries. Its merchandising embraces both retail and wholesale. Its retail trade caters not only to the city and suburbs, but to a large adjacent vicinity. Its jobbing trade, of many lines, occupies a sphere of influence, covering a wide area in its own and several states.

A CITY OF HOMES, SCHOOLS AND CHURCHES

Knoxville, because of its climate and its economic advantages, has developed a contented, intelligent and moral citizenship, consequently it is a city of homes, schools and churches. Probably no city in America has a larger percentage of its citizens owning the homes in which they live than the city of Knoxville. The primary, grammar and high schools are of excellent standard, not only in the city, but in the suburbs and in the country.

EDUCATIONAL FACILITIES

The University of Tennessee is located in Knoxville and ranks among the best of the higher educational institutions of the South. Military training is one of the features of the University. Technical training along the lines of chemical engineering, civil engineering, mechanical engineering and mining engineering are also efficiently featured at the University. The Legislature of Tennessee has recently appropriated one millions dollars to the University of Tennessee for building and general improvement purposes. This fund will enable the University to take its place in the very front rank of Southern educational institutions. Because of the magnificent summer climate of Knoxville, the Summer School of the South was established at this point, and the sessions of the school are held in the buildings of the University of Tennessee. Many students from every State in the South, and from many States in the North, East and West, attend this Summer School every summer.

HIGHWAYS

Knoxville and adjacent territory in Eastern Tennessee have adopted a progressive policy in developing public highways. No city in the South has so much mileage of good pike or macadam roads radiating in every direction as now exists in the vicinity of Knoxville. These roads connect Knoxville with Eastern Tennessee and with adjacent states. Knoxville is located on the Dixie Highway, the Bristol-Memphis Highway, the Robert E. Lee Highway, the Southern National Highway and other highways. Within 25 miles of Knoxville, there are 517 miles of macadamized roads in Tennessee. Within 50 miles of Knoxville there are 1262 miles of macadamized roads in Tennessee. Within 75 miles of Knoxville, there are 1832 miles of macadamized roads.

HYDRO-ELECTRIC POWER

The valley of Eastern Tennessee, with Knoxville as its center, and embracing a circumscribed area with a radius of approximately 75 miles, is unique in the amount of available latent hydro-electric power. As an example of what can be done in many nearby places, on several streams, the Aluminum Company of America is developing a series of plants on the Little Tennessee River, one of the tributaries of the Tennessee River, less than 40 miles from Knoxville, which will produce nearly half a million horsepower. This amount of power can be more than duplicated by combining the potentialities in the other streams of the District.

INDUSTRIAL POSSIBILITIES

The great storehouse of raw materials in close proximity to the city makes Knoxville a logical location for manufacturing and for economical production.

Nature has provided the raw materials and resources in Barite, Bauxite, Clays, Coal, Copper, Feldspar, Iron, Lead, Limestone, Lumber, Manganese, Marble, Petroleum, Phosphate, Slate, Sulphuric Acid, Tripoli, Zinc and Water Power. With proper study, and by the investment of sufficient capital, the raw materials, unique in variety and quantities, can be taken from this storehouse and made into articles of commerce and utility to supply our Nation in its present need and to enter extensively into the commerce of the world at large when the present war is over. Many industries not now conducted in Knoxville could be profitably conducted here.

With an abundance of coal close at hand, Knoxville is the logical site for by-product coke ovens, and for industries that grow out of by-products of coal.

With iron furnaces on three sides, with all needed raw material in every direction, and in close proximity, and with ample transportation, Knoxville is a logical site for a steel plant, and for iron working industries.

With copper mines and zinc mines of undoubted quantity and quality in close proximity, with an abundance of coking, fuel and gas coal close at hand, and with vast hydro-electric possibilities in the closely adjacent territory, Knoxville is a logical site for copper smelters and kindred industries.

With inexhaustible quantities of shale and of the purest of limestone in close proximity and with low cost, excellent fuel close at hand, Knoxville is a logical and proper site for a cement industry.

STRATEGIC COMMERCIAL CENTER

The strategically central location of Knoxville makes this city a logical point for economical distribution, not only to the markets of the continental United States, but also for export markets. The ports of the South Atlantic and the Gulf are located on an arc of a circle, with almost equal radii from Knoxville. With the congestion of the Eastern ports becoming more acute, it is readily apparent that import and export traffic of the future must increase and develop through the Southern ports. A glance at the map and a counting of the miles show Knoxville's unique and advantageous location as a distributing center. Manufacturers, who look intelligently into the future, would do well to consider the combination existing at Knoxville of abundant raw materials and power close at hand, and to the advantageous distributing facilities.

Knoxville is in the exact center of the eastern part of the United States. This is demonstrated by a combination of short line railroad distances to various points. The nearest point on the Atlantic Ocean is Charleston, S. C., 421 miles from Knoxville; the nearest point on the Mississippi River is Memphis, 422 miles from Knoxville; St. Louis, the fourth city in size in America and a great distributing center, 539 miles from Knoxville; Norfolk, on the Atlantic Ocean, almost the same latitude as St. Louis, 539 miles from Knoxville; Mobile, Ala., an important point on the Gulf of Mexico, 541 miles from Knoxville; Detroit, Mich., on the Great Lakes, 543 miles from Knoxville; Washington, D. C., 569 miles from Knoxville; Baltimore, Md., 549 miles from Knoxville; Jacksonville, Fla., 546 miles from Knoxville; Pensacola, Fla., 514 miles from Knoxville. More distant points include Portland, Me., our extreme easternmost commercial center, 1076 miles from Knoxville; Key West, Fla., 1068 miles from Knoxville; Duluth, Minn., on Lake Superior and close to the Canadian border, 1044 miles from Knoxville; St. Paul, Minn., a northwestern point and a distributing center, 947 miles from Knoxville; Galveston, Texas, 999 miles from Knoxville, and Houston, Texas, 950 miles from Knoxville. There are several routes between Knoxville and each of these points and freight cars can be operated through without transfer or additional handling.

TRANSPORTATION

Transportation is furnished for Knoxville by both the Louisville and Nashville Railroad and the Southern Railway System, the two greatest trunk lines in the South. Main lines of both these roads pass through Knoxville and each has several branches radiating from the city, furnishing service to and from contiguous territory. The city is also served by the Knoxville and Augusta Railroad, the Knoxville and Bristol Railway, and the Knoxville, Sevierville and Eastern Railway. Including all the main lines and branches, there are 14 separate service lines radiating from and furnishing service for Knoxville.

Knoxville is proud of and believes in its railroads. Knoxville realizes that the interests of the carriers, the shippers and the travelers are interdependent; consequently Knoxville will always meet the railroads in complete co-operation for general development and for mutual good.

AGRICULTURE

One of the chief industries of East Tennessee, with Knoxville as its center, is agriculture. Factors contributing to this industry are climate, soil and topography. All of these factors have contributed their special advantages to this favored region. The valley of Eastern Tennessee is suitable for practically all kinds of agriculture and horticulture. The sections closely adjacent to Knoxville are used largely for truck gardening, and the well-watered valleys throughout the entire area contribute to successful dairy farming. Cereals, vegetables, livestock and fruits are produced in all of Eastern Tennessee. Cotton is produced in counties to the southwest of the center of the territory and within 50 miles of Knoxville.

Because of the agricultural and horticultural advantages, East Tennessee produces food supplies not only for its own use but for export. The city of Knoxville has a city market supplied from East Tennessee farms. This market is the largest, most diversified and most reasonable for price in the South.

CO-OPERATION BETWEEN CITY AND DISTRICT

Knoxville believes in co-operation between the citizens of the city and the citizens of the adjacent country, or rural districts, because the enterprises and interests of each are interdependent. To this end, the progressive citizens of Knoxville, through the instrumentality of the Board of Commerce and the County Court of Knox County, jointly and by co-operation, recently bought and donated to the University of Tennessee for agricultural development purposes a farm of 700 acres. This farm is in addition to the farm previously owned by the University as an Experiment Station, and it will enable the University to render a broader and more efficient service, for all the people, in training scientific farmers. With this additional farm, the University of Tennessee now stands in the front rank, among educational institutions of the South, in ability to conduct experimental work and to impart scientific information for agricultural development.

AN INVITATION

Knoxville, through the Board of Commerce, invites professional men, manufacturers and investors to investigate its storehouse of raw materials. Knoxville believes in its agricultural, its climatic, its mineral and its topographical resources, and its geographical location. With these natural advantages, plus a progressive citizenship, Knoxville faces the future confident of a great development; and Knoxville seeks co-operation in developing these resources for the benefit of mankind.

KNOXVILLE, TENNESSEE AND VICINITY IS A GREAT NATIONAL ASSET

Knoxville more completely than any other conceivable point, meets the requirements of safety in location, for munition factories, gun factories, and general supply plants as prescribed by the "statement of a proper military policy outlined by the War College Division of the General Staff—War Department, September 11, 1915, Paragraph 60 of that statement reads as follows:

"As a general military principle, no supply depot, arsenal, nor manufacturing plant of any considerable size, supported by War Department appropriations for military purposes, should be established or maintained east of the Appalachian Mountains, west of the Cascade or Sierra Nevada Mountains, nor within 200 miles of our Canadian or Mexican borders, and steps should be taken gradually to cause to be moved depots and manufacturing plants already established in violation of this military principle."

Knoxville is a natural fortress. Knoxville has in close proximity an abundance of raw material including various ores and fuel. Knoxville has immense hydro-electric possibilities which means an abundance of cheap power. Knoxville has an ideal climate. Knoxville has ample transportation facilities for assembling raw material and for distributing finished products. Knoxville conscripts its raw materials and volunteers to co-operate with private capital or with Government appropriations in transforming these raw materials into finished products for the use of the nation.

"Knoxville with adjacent vicinity is a great National asset."

Kingsport, Tennessee



THE city of Kingsport is in the midst of the oldest settlement in East Tennessee. Long before the day of railroads it was at the head of navigation on the Holston River. For many years the products of the King Salt Co. were hauled across the country from Saltville, Va., and loaded on flatboats for transportation down the river. It was then known as King's Port, from which it derived its present name. Also prior to the railroad era Kingsport was an important point on the chief stage road between Baltimore and Memphis.

Kingsport continued to be a typical sleepy village settlement of the Southern Appalachian mountain section until the Carolina, Clinchfield and Ohio Railway was built through this virgin territory, and its line passed through Kingsport. Up to seven years ago nothing had occurred to change the character of Kingsport, and little did those living there think that in a short time it would become a thriving, important industrial center.

With the coming of the railroad, geological, timber and other experts were sent out to investigate the character of the country through which the railroad traveled in order to ascertain the possibilities for future industrial development. They found almost the entire territory contiguous to the railroad abundant in resources of mine, forest and field, with splendid water-ways traversing all parts of it, supplying the need for pure water and hydro-electric developments.

The result of these investigations was to establish at certain well-located points many important industrial enterprises. Of the points selected for such industries Kingsport has proven one of the most desirable, because here it was found that conditions were practically complete for creating an industrial center, where wide range of raw materials could readily be assembled, economically manufactured, and broadly distributed throughout the markets of the land.

The faith and foresight of those responsible for the inauguration of industrial activities at Kingsport is well justified in the splendid success that has followed these efforts, and Kingsport today, even with the remarkable progress it has made in the past seven years, looks forward with every assurance that the future will bring still greater expansion as a center of industries.

LOCATION.

Kingsport lies in the fertile valley of East Tennessee, at the junction of the north and south forks of the Holston river. Surrounding the city is a very rich agricultural section, which with its farms, stock raising and trucking, is a material asset to the city's well being. The construction and operation of the Carolina, Clinchfield and Ohio Railway opened up a new but rich section of the country. For manufacturing purposes it is most favorably situated with respect to fuel, raw materials and other resources essential to industrial development. A study of the illustration on this page will disclose the fact that Kingsport is conveniently located with respect to all of the large markets of the eastern portion of the United States. Kingsport is as close to Chicago as Buffalo, and it is about midway between New York and New Orleans. The wonderful industrial development that has already taken place in the South, when considered with the future prospects of a still greater industrial era for this section, makes Kingsport a strategic point for manufacturers that wish to serve the growing markets of the East, West and South.

Therefore, from the standpoint of natural advantages, Kingsport is especially well located. Within a short distance are found valuable resources such as minerals, timber, coal and water-power. These latter two are the main contributing factors to cheap power. Other resources that may be mentioned are: Efficient labor, building materials and transportation. It is evident then that Kingsport is assured of a great industrial growth.

POWER.

Cheap power, either steam-electric or hydro-electric, is essential to the success of a modern industry. In this regard Kingsport is certainly greatly favored by its location. Within a few miles to the north lie great fields of steaming gas and coking coals. Some of these coals are excellent for coking purposes, and in their immediate locality are coke ovens in operation today. With a down-grade haul, these coals are being transported into Kingsport at a very low freight rate.

Aside from the almost unlimited supply of coal, there are possibilities for

the development of cheap hydro-electric power. These prospective developments are within easy reach of Kingsport, and are situated on the large rivers that drain this Clinchfield territory.

Kingsport's claim as a cheap power center is not only theoretically true, but is actually supported by the demonstrated facts.

LABOR.

A plentiful supply of efficient labor is, of course, necessary for the operation of any industry. There are many conditions that contribute to the efficiency of labor, some of these may be mentioned as living conditions, climate, cost of living, sociological and civic conditions, as well as advantages for educational and religious activities. The character of the labor available at Kingsport and the surrounding territory is of the native Anglo-Saxon type, perhaps the most efficient labor to be found anywhere.

Situated as it is, practically in the center of the wide valley of East Tennessee, and also within easy reach of the great valley of Southwest Virginia, Kingsport has a contiguous area of thickly populated districts from which to draw its supply of labor, and this labor is made healthy, contented and efficient by the favorable climatic and living conditions. The agricultural districts produce foodstuffs nearby which keep the cost of living at a comparatively low figure. Her well-appointed churches and schools and her transportation facilities are great factors in the happy solution of the labor problem.

BUILDING MATERIALS.

In Kingsport today are manufactured a quality of brick for building purposes that is perhaps unsurpassed anywhere in the country. These bricks are of both the plain and textured variety. The material and facilities for making a high-grade acid-proof brick are also available here. A high-grade tile is also produced. A modern Portland cement plant furnishes cement to industries throughout this territory. A modern lime plant, making quick and hydrated lime is in operation. The surrounding forests furnish an adequate supply of timber of all kinds. In addition to these, this territory offers a supply of limestone, slate, sandstone, sand, gravel, marble and granite, which make this section one of the richest in natural building materials. All of these are within easy reach, and most of them are practically at the door of industries located at Kingsport.

RAW MATERIALS.

The Clinchfield territory, with Kingsport as the center, has a greater variety of minerals of commercial value than any other portion of

America of equal or greater area. Among the minerals found near at hand are:

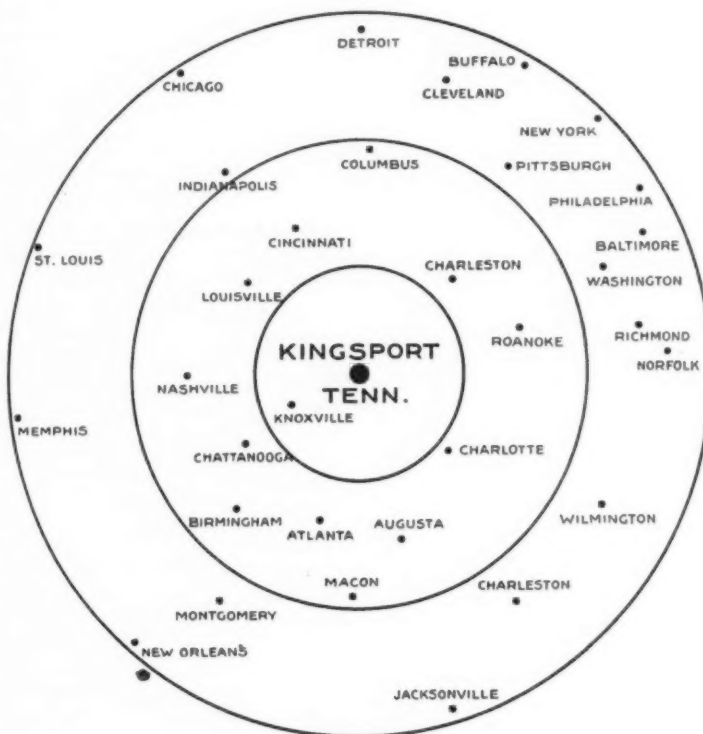
IRON	FELDSPAR	DOLOMITE	KAOLIN
MANGANESE	QUARTZ	LIMESTONE	MICA
ZINC	SILICA SAND	SOAPSTONE	ASBESTOS
CHROME	FIRE CLAYS	TALC	OCHRES
BAUXITE	SALT	PYRITES	GRAPHITE
PHOSPHATE	GYPNUM	BARYTES	CORUNDUM

The great forests of the Southern Appalachian mountains lie in this territory, and it is conservatively estimated that the number of feet of merchantable timber now standing within a radius of 100 miles of Kingsport, will run up into the billions. The varieties of timber include:

OAK	BEECH	YELLOW PINE	POPLAR
HICKORY	BIRCH	CHERRY	CUCUMBER
MAPLE	ASH	CHESTNUT	BASSWOOD
GUM	BUCKEYE	SPRUCE	SYCAMORE
WALNUT	WHITE PINE	HEMLOCK	LYNN

TRANSPORTATION.

The line of the Carolina, Clinchfield & Ohio Railway furnishes adequate transportation to all points. At its northern terminus connections are made at Elkhorn, Ky., with the Chesapeake & Ohio Railway, which gives ready access to the great markets of the West. At Johnson City, 25 miles south of Kingsport, direct



Kingsport, Tennessee

connection is made with the Southern Railway traveling North and South, and reaching the Norfolk & Western Railway at Bristol, while the main line of the Clinchfield, extending across the mountains into the Carolinas, gives direct connection with all the great trunk lines of the Southeast, affording every desired advantage for broad distribution of finished products made at Kingsport. The Clinchfield is a modern and well-constructed road, built for permanency and for economical operation. It taps the coal fields on the north and the cotton-mill districts on the south. Along its line are located vast mineral deposits, as well as great forests of virgin timber.

Kingsport, therefore, presents superior features both from the standpoint of assembling raw materials and the distribution of the finished products. Having regard to both of these conditions, essential to important industries, it is believed that Kingsport is unexcelled as a desirable center, in efficient touch with all portions of the country.

ESTABLISHED INDUSTRIES.

The first industries established in Kingsport were those of the Kingsport Brick Corporation and the Clinchfield Portland Cement Corporation.

How both of these have steadily expanded is indicated by the fact that the brick plant has reached a production of 150,000 bricks per day, and has added a new \$100,000 plant to make sewer pipes, structural tile, draining tile, etc. The Portland cement plant started with an initial production of 2500 barrels per day, which has grown to 5000 barrels daily production, making it one of the largest cement plants in the South. It has also just completed a \$100,000 lime plant, making lump lime for industrial purposes, hydrated lime and agricultural lime.

The cement company is now installing an electrical precipitation process for recovering potash, of which four and one-half tons will be secured daily, with the prospect of doubling this.

A large modern chemical and dyestuff plant was established by the Federal Dyestuff & Chemical Co. The buildings of this plant extend over 200 acres of land, and are arranged to turn out a wide variety of chemical products.

An especially interesting group of plants at Kingsport are those of the Kingsport Extract Corporation and the Kingsport Pulp Corporation. These two companies have created a series of plants which will dovetail one with another and will include the manufacture of tannic extracts, the tanning of hides, the manufacture of wood pulp and of paper products.

The aim of this series of plants is to turn out their various products in completely finished form instead of passing them along to other places for further manufacture.

One of the most recent plants to be located in Kingsport is that of the Kingsport Wood Reduction Company, which is being established here by the American Wood Reduction Company of Chicago. This plant will involve construction work estimated to cost between \$750,000 to \$1,000,000, and it will utilize the extensive raw materials available from the forests along the Clinchfield.

In addition to these larger industries there have been established, of course, a number of smaller ones necessary to the comfort, welfare and upkeep of a growing city of this kind, and there have also been erected many important business buildings for commercial and financial purposes.

When it is considered that this wonderful industrial progress has been made within seven years, coupled with the further fact that Kingsport lies in the very midst of unusual and extensive deposits of minerals and coal, large forest

arens and water power possibilities, an abundance of desirable labor and complete transportation facilities, there is every reason to look forward with the establishment in the near future of many other plants at this point.

AS A SITUS FOR CHEMICAL INDUSTRIES.

From investigations made by chemical experts, Kingsport has shown up remarkably well as an ideal situs for such industries. Bearing out this claim is the statement of a well-known chemist who, following his study of Kingsport's advantages for chemical industries, said:

"Kingsport is as near Chicago as Buffalo. It is therefore at the door of the great markets of the Middle West. It is nearer the textile market of the South than any of the chemical manufacturing plants of the country. Therefore, a plant located at Kingsport can compete in these markets better than if located in the North or West. Very high-grade coal in abundance is in the immediate vicinity, some of the coal veins being located at a distance of 12 to 16 miles. Limestone, iron ore, manganese, barytes, zinc, blende, pyrites, bauxite, kaolin, hardwood and other raw materials are to be had in abundance within a very short radius of this point. When you consider the great tonnage of raw material that is necessary to keep a chemical plant in operation, and take into consideration the fact that outgoing products travel in all directions, it is a very great advantage for a manufacturing concern to locate at or near the raw products. Kingsport has a mild climate, has an abundance of soft water and is particularly well located with reference to railroad connections."

Considering the industries of a chemical or associated character that have already been established at Kingsport, and the remarkable range of raw materials found nearby, its abundance of pure water and high-grade coal, together with its shipping facilities for quickly distributing products in every direction, Kingsport offers a situs for chemical industries that should appeal with peculiar interest to those seeking a place where such plants can be operated economically and profitably.

POPULATION.

In 1915 there were only about 1200 people in Kingsport, but with the steady increase in the establishment of industrial plants, bringing here large numbers of workmen, the population has steadily grown until now more than 10,000 people live in Kingsport, which is, indeed, a striking example of how remarkably this city has grown.

STABILITY—PERMANENCE.

The city of Kingsport has been planned and is being built with forethought, having consideration for its future development. It was planned by a well-known expert—John Nolen of Cambridge, Mass., and many of the city's principal structures have been designed by Clinton Mac Kenzie, the well-known architect of New York city. Even the water supply, the sewerage system, the lighting of the town and the parks and streets have all received careful consideration, with the city's future growth and development uppermost in the minds of the men who are responsible for the city's development. This thought is also carried out in the affairs of the city, which are administered by one of the most modern "city manager" forms of government, having been worked out in coordination with the Rockefeller Bureau of Municipal Research. These features contribute to the permanency and stability of this new industrial city of the Appalachian South that is today attracting the attention of manufacturers and engineers all over the country. Among its present population of 10,000 people are real live and progressive citizens who will welcome and co-operate with those who locate in their midst.

Ask for the latest Illustrated Booklet of Kingsport.

For Detailed Information, Write

KINGSPORT IMPROVEMENT CORPORATION
KINGSPORT, TENNESSEE

The South's Greatest Offer to Electrochemistry— Muscle Shoals



AMONG the assets of the American nation there is none perhaps which exceeds in value and importance that great prosperous section south of the Ohio River, which stretches from Missouri, Arkansas and Texas to the coast of the Atlantic. The endowment of natural riches of this section, particularly in the Southern Appalachians and adjacent territory, is most bountiful, and in spite of wholesale shipments of raw material to manufacturers in other sections of the country, the resources of this section have hardly been touched. To the electrochemist and the electro-metallurgist there is probably no more promising and undeveloped asset than the water-powers of this region. These powers are largely found in a single belt which is formed where the central highlands meet the coastal plain in a "fall line," so that the beds of the streams drop rapidly for a distance of many miles, forming a series of shoals. From the Potomac on the north to the Chattahoochee, Coosa and Warrior rivers on the south there is no important southern coastal stream which is without its power section.

But the possibilities of these coastal streams become insignificant when compared with the power that may be generated in the majestic Tennessee. Across a width of nearly two miles the waters churn themselves into foam as they swiftly rush from the highland rim to the coastal plain at Muscle Shoals. Here, after years of painstaking study, the Government engineers have made plans for the improvement of this section of the Tennessee River for modern navigation traffic and for the consequent development of some 660,000 horsepower—85,000 horsepower more than the combined developments at Niagara Falls on both sides of the river. These engineers have approved estimates which show that the cost of this power when developed will amount to \$7 to \$9 per horsepower-year, allowing interest at 4 per cent. on the Government's investment, annual depreciation at 10 per cent. on machinery and 2 per cent. on all other improvements. Here it is estimated that 400,000 horsepower will be made available to industries at a price that is materially less than the price of power at Niagara Falls.

If this power were found on the bleak coast of Labrador at such a price as this, it may be safely said that the electrochemical industries would seek it out and make use of it, but instead it is located in the very midst of the greatest producing districts of raw materials for electrochemical and electrometallurgical purposes in the United States, and at its foot are found the Muscle Shoals tri-cities—Florence, Sheffield and Tuscumbia, Ala.—which offer their combined advantages to the electrochemical and electrometallurgical manufacturer who desires to make use of the Muscle Shoals power in this favored location.

To the manufacturer of fertilizers the tri-cities offer every inducement. Here is the necessary high calcium limestone, and within easy reach is the high-grade coking coal so necessary in the fixation of nitrogen, and the establishment of the \$36,000,000 nitrate plants at Muscle Shoals indicates how highly the Government regards the advantages of this location for the manufacturer of nitrogenous products for the purposes of peace or war.

For the manufacture of high-grade steels this site has much to offer. Near at hand are reserves of hundreds of millions of tons of rich brown ores, which with the advent of the electric steel furnace, supplied liberally with cheap power, will now come into their own, for instead of high phosphorous pig-iron from which could be produced only a grade of steel which could not meet the Bessemer specifications, there may now be manufactured by the aid of the electric furnace the highest grade of electric steel, equal to the best crucible steel in quality, and at a remarkably low cost. No thousand-mile haul of the ore is here required before it meets the fuel as with Northern ores, no trans-shipment from rail to water and from water to rail to bring the ore to the furnaces, and no deep expensive mining of the ore is required, for the brown iron ores are mined with the steam shovel.

Here is found silica of a high degree of purity, and the requirements of the manufacturer of ferro-silicon and other ferro alloys are met in a highly advantageous way. Already ferro-silicon and ferro-phosphorus are being made in the valley of the Tennessee.

Probably no discovery of greater value to the farmer has been made in recent years than the successful electric furnace process for treating phosphate rock, and within 60 miles of Muscle Shoals are the great phosphate fields of Southern Tennessee, where hundreds of millions of tons of phosphate rock, brown, blue and white, await the magic transformation of the electric furnace to make them an important ingredient in a highly concentrated fertilizer—ammonium phosphate—which can be sold to the farmers at a low price. Furthermore, when the Muscle Shoals dams are complete barge lines may run from the Shoals directly into the phosphate fields.

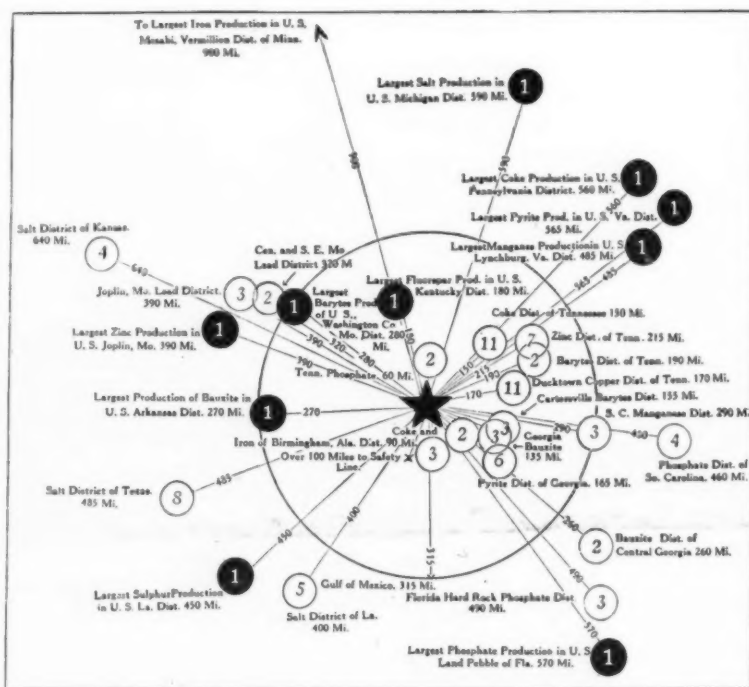
Sulphuric acid, one of the most important raw materials in chemical industry, is available in abundance, as the largest plants in the world for the manufacture of this acid are located but 170 miles from Muscle Shoals, in Southeastern Tennessee, where is

found the greatest copper-producing district east of Arizona, excepting only the mining district of Northern Michigan.

The great zinc deposits of Tennessee are but 215 miles from this site to the northeastward, while the greatest zinc fields in America, if not in the world, are to be found in Southwestern Missouri, 300 miles to the northwest, where an area of about 100 square miles produces 50 per cent. of the zinc yield of the entire United States. Smelters in nearby States at sites having water freight rates furnish economical sources of supply of this important metal, the nearest being at Mascot, Tenn., on the Tennessee River, 225 miles from Muscle Shoals.

Bauxite or aluminum ore is found in largest quantity in America in the Arkansas district, 270 miles westward from Muscle Shoals. This material is now hauled more than a thousand miles to Niagara Falls for reduction to the metallic aluminum. The second largest producing district, 260 miles to the Southeast in Georgia, also furnishes abundant supplies of this ore, and scattered deposits are found in other nearby regions.

Manganese has been located in paying quantities in the Lynchburg district of Virginia, 485 miles from Muscle Shoals, where the ore runs as high as 33 per





PANORAMA OF TENNESSEE RIVER AT THE SITE OF MUSCLE SHOALS DAM, NOW UNDER CONSTRUCTION.

cent. pure manganese. Other deposits are found in Cartersville, Ga., 150 miles away, and what is probably the most important reserve of manganese within convenient reach of Muscle Shoals is at Independent City, Ark., 300 miles westward.

Fluorspar, which finds important uses in electrochemistry, is to be had in the Kentucky district, the largest in America, 180 miles to the northward, while the all-important salt is found in beds nearly 2000 feet in thickness 400 miles to the south in Louisiana. Pyrites is available in great quantities in the first rank deposits of Virginia, 565 miles from Muscle Shoals, while smaller supplies are available in Cherokee and Carroll counties, Georgia, at a distance of 165 miles. Barytes for the manufacture of fertilizers, paints, rubber, paper, cloth, etc., is available in large amounts in the Washington county district of Missouri at a distance of 280 miles from Muscle Shoals, this district producing about 65 per cent. of our domestic output.

Portland cement requires for its manufacture an assured supply of limestone, clay or shale in the same locality with cheap fuel. These conditions are fully met at many points near Muscle Shoals, and a large Portland cement plant is located at Richard City, on the Tennessee River, about 150 miles from the Shoals. Other plants are found at Kingsport, Tenn., and in Alabama and Georgia. Of clay for refractories, as well as for brick and tile, cheap pottery and drain pipe, terra-cotta and paving brick, or kaolin for chinaware and paper-making, there is an abundant and varied supply in the immediate locality of Muscle Shoals and in West Tennessee, while the Alabama graphite district, about 150 miles away, assures a large supply of the necessary raw material for the manufacture of electrodes.

Sulphur is to be had in purest form in Louisiana, where the enormous deposits of this commodity are the largest in the world.

In fact, it has been said that there are produced in the United States 57 useful minerals, and every one of these is mined in the South except platinum and borax.

The future holds much of promise to the electrochemist in this region. Given the power cheaply enough for the electric furnace, who shall say that potash will not be profitably obtained from the high-grade feldspars of the Southern Appalachians, or that the magnesian dolomite which abounds in this section shall not be made to yield a great future rival of aluminum?

But power and raw material, important as they are, constitute but a part of the advantages to be had in this section. Here is an abundance of suitable

labor well acclimated, and the effect of the coming of the nitrate plants has been to develop the Muscle Shoals vicinity as a great labor center, which is growing rapidly in importance. Here permanent housing is being provided for thousands upon thousands of laborers, and the manufacturer coming to this section, especially at the completion of the great Muscle Shoals dam, is likely to find an abundant supply of suitable labor.

Adequate transportation facilities place the manufacturer who locates at Muscle Shoals in close touch with the great markets of the country, for here are transportation facilities for shipment by rail by direct routes to the manufacturing centers of the East and North, or by water to any of the hundreds of ports on the 14,000 miles of navigable streams that connect with Muscle Shoals. At

the Tri-Cities bond issues have been passed, and plans are being made for two great reinforced municipal river terminals so that the advantages of modern navigation, with its steel tow-boats and specially-designed barges for handling heavy freight mechanically, may be made available to the smallest manufacturer. The building of the Muscle Shoals dams will open the upper Tennessee River to through navigation and bring the coal fields of East Tennessee to the door of the Muscle Shoals manufacturer at very low cost.

Hundreds of thousands of acres of woodland contribute a great variety of timber to the manufacturer of this district, and those processes requiring cotton in their manufacture find an abundant supply in this immediate locality.

A mild winter climate insures freedom from ice troubles in the power

plant, and where living is cheaper than in the North, labor is also cheaper in normal times.

Factory sites in great variety are available at the Tri-Cities, and an inquiry addressed to the secretary of the Commercial Club at Florence, Sheffield or Tusculumbia, Ala., will assure the inquirer of such additional information as he may require, and it will be the pleasure of the several commercial clubs to afford the manufacturer in search of a location every facility for effective assistance. No one can study the wonderful developments underway in the Muscle Shoals district without realizing that there are possibilities here for the establishment of electrochemical and associated industries not surpassed by any other part in the country. Given such a large volume of electric power, and a wide variety of minerals suited for many diversified undertakings, and with adequate labor supply, transportation facilities and an ideal climate, what section indeed can match the opportunities presented by the Muscle Shoals section?



MINING PHOSPHATE ROCK IN TENNESSEE, 60 MILES FROM MUSCLE SHOALS.



A LIMESTONE QUARRY SITE ON THE TENNESSEE RIVER NEAR MUSCLE SHOALS.

JOHNSON CITY

GATEWAY TO THE APPALACHIAN SOUTH—FIRST STOP
EN TOUR OF AMERICAN ELECTRO CHEMICAL SOCIETY

THE American Electrochemical Society, making a tour of the Appalachian South by special train out of Washington, D. C., on Sunday, April 28, is scheduled to arrive at Johnson City, Tenn., over the Southern Railway at 6.40 A. M. Monday, April 29. This is the first stop en tour. The tourists will be breakfasted at 7 A. M. at one of the leading hotels as guests of the local Chamber of Commerce. After breakfast the touring party will be given an automobile trip over the city, to the National Soldiers' Home and other points of interest. At 9 A. M. the guests will depart for Kingsport, in their special train, over the C. C. & O. Railway, where they are scheduled to arrive at 10 A. M.

Johnson City is "no mean city." Situate in the third county from the extreme northeast corner of the State; right among the foothills of the Appalachian range; at the crossing of two great trunk lines of railway, the Southern and the C. C. & O. (Clinchfield); at the terminus of the E. T. & W. N. C. Railroad; it is, in fact, the gateway to the Appalachians. It is in the beautiful and fertile valley of the Watauga River, and almost midway between the Cumberland Mountain and the wonderful Blue Ridge.

It has the double advantage of unlimited manufacturing and mining development, and is located in one of the finest sections of the country for general utility farming.

Nature has never designated a more beautiful, healthful or resourceful spot for a city on earth, nor placed in abundance such vast quantities of raw material—timber, chemicals and minerals—for its support than that which surrounds Johnson City.

Owing to unlimited facilities at its very door, Johnson City is rapidly coming to the front and making notable strides in the field of manufacturing, and has a bright future in this respect.

Many factories have located here, after carefully looking over the situation, and others are now considering its advantages, so that there is no doubt that Johnson City is destined to be one of the principal manufacturing points in the South.

Statistics cannot show all that Johnson City offers for the manufacturer who is seeking a new location. First and best, Johnson City will share with the manufacturer the spirit of success. The spirit of success, intangible and indescribable, is a co-mixture of confidence, perseverance and willingness to win by any amount of hard work, but under no conditions of ease to fail. Our industries are soundly built, firmly propped by the financial resources of our city, fostered by the loyalty of the people. And the spirit which such industries engender is the spirit which we offer to the manufacturer who seeks it and deserves it.

The railroad facilities are unexcelled. Freight rates are favorable to Johnson City. Passenger transportation is ideal—16 trains daily. Freight is handled with remarkable precision and dispatch. Excellent factory sites, along railroads or connections, are available at very low prices. An abundance of high-grade soft coal at low prices. There is a high class of citizenship, high class of labor, healthy surroundings for labor and freedom from labor troubles.

The Chamber of Commerce invites the attention and careful inspection of all those who are looking for ideal location for any business or industrial development to the exceptional opportunities offered by Johnson City and this section.

We have confidence in offering the widest range of raw materials, excellent climate, exceptional transportation facilities, agreeable citizenship, fine schools, better than normal social conditions, and absence of labor difficulties.

Population more than 14,000; area 4600 acres; elevation above sea level 1700 feet; bank deposits \$3,000,000; bank clearings over \$30,000,000; three railroads and one branch road; 16 passenger trains daily; electric trolley line, with six miles of track; 40 manufacturing industries (including one large chemical plant) employing more than 2500 men, women, girls and boys, with a monthly payroll of \$150,000.

Principal plants: Woodworking, chemical, iron, silk, hosiery and flour.

The home of the famous Cranberry pig-iron, the only iron in the South meeting fully the requirements of the United States Government for making armor plate.

Has eight churches; three white elementary schools and one high school, with 3000 pupils and 50 teachers; two colored schools, with 600 pupils and 12 teachers; two theaters and vaudeville houses.

Has 60 miles of concrete sidewalks, 16 miles of brick and asphalt paved streets, 18 miles of sewer, 21 miles of gas mains, 60 miles of water mains; splendid water-works, gravity system, owned by the city; an ample supply of the best free-stone water in the world—full capacity four to five million gallons daily; present consumption two and one-half million gallons.

Has modern hydro-electric plant, 5000 horse-power, with total capacity, when fully developed, of 13,500 horse-power, with auxiliary steam plant to insure continuous service.

Has paid fire department and excellent motor-driven fire truck; efficient police department.

Has four hotels, four first-class apartment-houses and many good restaurants and private boarding-houses.

Has six up-to-date department stores; one modern hospital; one up-to-date daily afternoon newspaper, with full Associated Press service, and two weekly newspapers; a splendid United States Postoffice building, with Postal Savings Bank station.

Has many wholesale and jobbing-houses—two wholesale dry goods, four wholesale grocers, one wholesale fruit, one wholesale hardware (one of the largest in the South).

Has a country club, golf course (nine holes, 2800 yards.)

Has a hosiery mill, a chair factory, a furniture factory, a chemical plant, a silk mill, a foundry, an iron furnace, a large loose-leaf tobacco warehouse, a model flour mill (capacity 1000 barrels daily), a large tannery, an extract plant, an ice and cold-storage plant and numerous woodworking plants.

Has East Tennessee State Normal School; cost \$300,000; 25 teachers and professors, 1000 regular students, and 700 in the summer school.

Has National Home for Disabled Volunteer Soldiers, cost \$3,000,000; annual expenditures \$600,000; 2000 inmates and employees. This is admitted to be the finest soldiers' home in the country, and is located just outside the corporate limits.

Johnson City is a city of agricultural, mercantile and manufacturing wealth. The public utilities are all high-class. The climate is most healthful. It is an ideal home city. The four banks are progressive and solid, with a disposition to invite and encourage healthy industries.

Has excellent educational advantages, and churches of every denomination.

In short, Johnson City is the home of the bounty of God in Nature; the home of wealth; the center of the region of opportunities.



UNIVERSITY OF CHATTANOOGA. PARTIAL VIEW

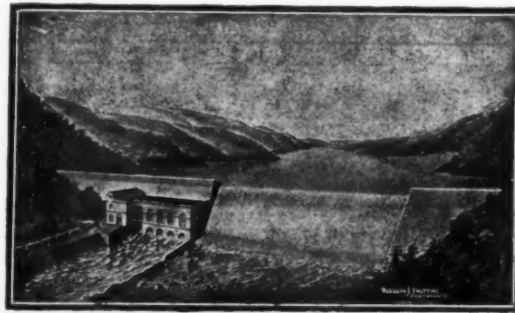
Attention Electrometallurgists To Chattanooga!



INDUSTRIAL Hub of the South, which, according to U. S. Government Reports and analyses of experts like John Jermain Porter, Willis G. Waldo and others, has unusual advantages by reason of the close association of lime, coal, iron, bauxite, shale and clays in enormous quantities, and other minerals in somewhat less profusion.

Chattanooga is one of the few cities chosen for a day's visit in connection with its first convention in the South by the American Electrochemical Society for this reason, as witnessed by the presence at Chattanooga of plants for manufacture of aluminum sulphate, coal by-products, cottonseed-oil compound, ferro-alloys, box-board paper, shale brick.

Chattanooga's factory list embraces over 300 plants (U. S. 1914 report shows 275) and over 1200 kinds of products. This is true because almost anything into the manufacture of which iron, cotton and wood enters can be more cheaply made there than at any other Southern point and nearly all Northern points.



POWER PLANT NEAR CHATTANOOGA

Splendid opportunity exists for manufacture of silks (field vacant), yarns, gloves (field vacant), garments, carpets (field vacant), hats (field vacant), shoes (field vacant), pulp and paper (now one plant for box board), ice and refrigerating machinery (field vacant).

Absolutely confidential and careful handling of all inquiries by

Industrial Bureau

OF

Chattanooga Chamber of Commerce

CHATTANOOGA DEVELOPS MAN POWER, HYDROELECTRIC POWER

THE ALABAMA COMPANY

BIRMINGHAM, ALA.

Manufacturers of Pig Iron

"CLIFTON" BRAND

Silicon.....1% to 4%
Sulphur uniformly low.
Phosphorus......40% to .70%
Manganese......1% to 2%

An ideal iron for carwheels,
cylinder castings and all
high-class work.

"ETOWAH" BRAND

Silicon......1% to 4%
Sulphur uniformly low.
Phosphorus......70% to 1%
Manganese......40% to .70%

A dependable iron for all
classes of foundry
work.

Producers of Foundry Coke and Smithing Coal BROOKWOOD BRANDS

COKE

High Carbon, low Ash and
low Sulphur, good structure
and uniform quality.

SMITHING COAL

Washed and sized, low Sul-
phur and low Ash. For heavy
forge work it has no equal.

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WE offer the benefit of over 30 years' experience in industrial research and in the solution of difficult and troublesome problems in manufacture. We help our clients to lead the procession and to prepare themselves to meet buyers' markets.

Our staff is familiar with industrial problems and is constantly engaged in a great variety of work. The immediate incidence of the minds of all department heads and the suggestions of their assistants upon unsolved problems as they are presented (when such aid may properly be drafted), often enables us to attain results much earlier than would otherwise be possible.

Our records cover research in nearly every branch of industry. This is all in orderly arrangement in our library, which contains over 30,000 sources of information in manuscript and in print. It is catalogued by means of nearly 100,000 cards. The value of this needs no emphasis.

Our reports are recognized as models of clear statement and useful information. They contain no padding, they stick close to the subject and what pertains to it and they carry, in addition to our own research, the latest advances known to science. They are designed to instruct the man who wants to know, and we make a point of seeing to it that he understands what we say.

May we send you a *Questionnaire* as to your problems? A postal card will bring it.

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JEFFERSON COUNTY BANK BUILDING.
BIRMINGHAM, ALA.

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The files of this office and its advisory services are freely offered without charge to financially responsible parties who are interested in opening up and in increasing the production of war minerals and products at present needed for war purposes by the Government.

HAVE YOU READ THIS PAMPHLET?

Rev. Newell Dwight Hillis'
Picture of Germany's War Plans
and
Her Atrocities in Belgium
and France

This 12 page pamphlet has been widely read in America and 10,000,000 copies have been printed in England.

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CLEARWATER, FLA.

100,000 Tons of Potash Obtainable from Cement Dust Every Year

POSSIBILITIES OF EXTRAORDINARY VALUE TO AGRICULTURE DEMONSTRATED BY SUCCESS OF NEW INDUSTRY AT SECURITY, MD.—PROFITS FROM POTASH GREATER THAN FROM CEMENT—COST OF POTASH INSTALLATION, OVER \$100,000, MORE THAN PAID FOR IN A YEAR—ENLARGEMENT OF CAPACITY AND OTHER EVIDENCES OF SUCCESS—OTHER CEMENT COMPANIES DOING SIMILAR WORK.

By SAMUEL G. WILMER.

A new industry which has been in process of development during the last five years has now become of the greatest importance to the farmers of this country because by further development it will materially relieve them from the difficulties they have encountered in the matter of fertilizing on account of the absence of German potash from the market. This is the production of potash in the course of cement manufacture, and while the aggregate quantity to be obtained in this manner may, according to expert estimates, be equivalent to not over one-third of what our imports of German potash were before the war began, it has been demonstrated conclusively that it can be produced at such a price that, if necessary, it can compete with the imported article even at pre-war figures, and eventually the estimated aggregate production may be much increased.

Furthermore, in at least one plant now producing potash in this new way the profits resulting from its manufacture and sale are much greater than the profits from the manufacture and sale of cement for which the main plant was constructed. This is the case at the works of the Security Cement & Lime Co. of Hagerstown, Md., where the cost of the installation of the first potash unit (more than \$100,000) was more than repaid by the profits of its first year of operation, and, moreover, that profit was greater than the company's profit on cement.

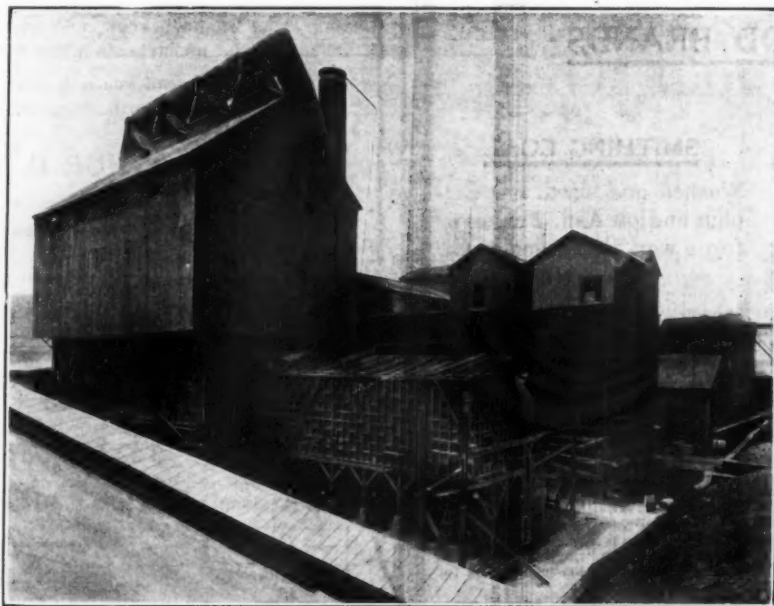
In about a month, or possibly within a week or two, this company will put in regular operation an entirely new type of treater for the recovery of potash from the dust that is caused during the manufacture of cement from a particular variety of limestone which is abundant in the company's quarries, about four miles from Hagerstown, and adjacent to which the works are located. This new potash unit is in addition to the treater which has been used for nearly two years, since the company began the work of recovering potash. The two units will operate in series, the new one precipitating the potash in the presence of water, thus gathering it in the form of a solution and so collecting potash which the first unit has not obtained in the form of powder. This addition to the potash department of the plant will greatly increase the quantity of the product obtained, and it is also expected to produce a nearly pure salt, one which chemical manufacturers can use. The annual output will then be from 1000 to 1200 tons of potash.

The Security Cement & Lime Co. was the first concern to build a plant specifically to obtain potash as a by-product of cement manufacture, the very first plant to so gather potash being that of the Riverside Portland Cement Co. at Riverside, Cal., but the Riverside concern had installed its plant primarily to precipitate and collect the cement dust which previously floated out from the stacks and caused complaints of damage from fruit growers in the vicinity, while after it was installed and operated it was accidentally discovered that the dust was profitably rich in potash. Moreover, the Security is the first plant using coal as fuel in the extraction of potash from cement; the Riverside plant uses oil.

The electric precipitation process for recovery of potash which is used at Security, that being the name of the company's plant and railway station, was invented by Prof. F. G. Cottrell, who was at the time of its invention professor of chemistry at the University

of California, and afterwards chief chemist of the Bureau of Mines at Washington. It is controlled by the Western Precipitation Co. of Los Angeles, Cal. The first unit at Security consists of a building, shown in the accompanying illustration, 35x70 feet and 65 feet high, containing 800 sections of steel pipe 16 feet long by 12 inches in diameter, the pipes being arranged in two groups of 400 each. Through the middle of each pipe runs a wire carrying a 60,000 to 70,000-volt electric current. Then there are five kilns, which are cylinders tilted upward at one end, the mix, as it is known, being poured into the upper end and the coal, which is powdered, being blown in at the other extremity, making a powerful flame under air pressure.

Concrete is the material used in building the new



FIRST UNIT OF POTASH TREATER PLANT AT SECURITY.

type of treater unit, which was designed by the Western Precipitation Co. and the Security Cement & Lime Co., of which latter John J. Porter is vice-president and general manager. It was much less expensive to build than the first unit, the flues being of concrete instead of steel pipe, and it is more substantial. This unit is now being tested preliminary to regular and continuous operation.

It was in June, 1916, that the Security Cement & Lime Co. placed in regular operation its first potash unit, and its results have been exceedingly successful, fully and liberally justifying the enterprise and nerve of the directors, who invested more than \$100,000 in the very beginning in what was an almost untried industry. Thus they have been able to obtain daily up to the present time from two to three tons of potash, or, as the chemists express it, pure K_2O combined principally in the form of chloride and sulphate of potassium. Estimating on the basis of the lowest amount obtained per day, viz., two tons, this would be equal to providing for the manufacture of 100 tons of fertilizer with a 2 per cent. potash content, and this, if used economically at the rate of 500 pounds or a quarter of a ton per acre, would provide for fertilizing 400 acres of land every day this plant operates. But there are also two other plants, besides the Security and Riverside, now operating, these being the Coplay Cement Manufacturing Co. at Coplay, near Allentown, Pa., and the Alpha Portland Cement Co. at Cementon, N. Y., the headquarters of the latter being at Easton, Pa. Then there are others, including the Clinchfield Portland Ce-

ment Corporation at Kingsport, Tenn.; the Dexter Portland Cement Co. at Nazareth, Pa., and the Ironton Portland Cement Co. of Ironton, O., which are putting in potash units, all of these to add considerably to the amount of potash which this country is producing for the advancement of agriculture and its independence of the supply formerly obtained from the German mines.

It is most gratifying to all concerned that the potash industry at Security has been a success from the start. Over two years ago it was estimated that the cost of extracting the potash from the cement dust would not exceed \$20 per day for labor, power and maintenance, and these original figures have been confirmed by experience. In other ways the company enjoys an advantage above the average; for instance, its raw material contains somewhat more than the usual amount of potash, or 1.2 per cent. of K_2O , whereas the average found is about three-quarters of 1 per cent., or, decimally, .75. The potash volatilized by the electric process has also been increased since the start, it being in the beginning about 40 per cent. of the amount going through the kilns, while now it is about 70 per cent. Then the finished product, which at first ran about 6 per cent. potash, now averages 10 per cent. potash, and sometimes it goes up to 13 or 14 per cent. The product consists otherwise of substances also valuable for the improvement of farming land, the bulk besides the potash being carbonate of lime. The importance of this to American agriculture is therefore clearly apparent.

Only a year after the plant at Security began operating regularly Mr. Porter said: "The profits earned on the collection of potash have already more than paid for the original cost of the installation, and, best of all, our results indicate that it will be possible to compete with German potash on a pre-war price basis if necessary and still make a fair profit. * * *

"In view of the margin for improvement both the Security company and the Western Precipitation Co. have been active in research work, and as a result both percentage of collection and profits have increased every month, and still bigger things are in prospect for the future."

Part of the potash collected was in a form difficult to dissolve, due to the fact that it had recombined with the fine ash of the coal used in burning the mix. Concerning this, Mr. Porter said: "It has been found that the recombined potash can be readily brought into solution by prolonged boiling, by treatment for one hour with high-pressure steam, or by treatment with very dilute acid. It has further been found that, although this recombined potash is not extracted by the

standard method of analysis for soluble potash used by the fertilizer interests, it is really in an ideal form for assimilation by crops, because its slow solubility liberates the potash as needed and lessens loss through leaching. This view has received the approval of eminent authorities, and will no doubt in time lead to a change in trade standards. Up to this time German potash has monopolized the market and all trade practices and standards have been based on the behavior of this material.

"There is no difficulty in collecting potash at any cement plant. The real difficulty is to collect it in a sufficiently concentrated form to be marketable. Results recently obtained enable me to state with confidence that this can be accomplished, even when the raw mix is quite low in potash, by the use of fractional precipitation, together with appropriate treatment of the concentrated potash dust in order to render soluble the recombined potash. In spite of the work done at Riverside, the real nature of the problem was not understood when the Security company started in the potash business. In particular the difficulties introduced through the use of coal as fuel were entirely unknown at that time. As a result of the pioneer work done at this plant, however, other companies will be able to go ahead with far more assurance of success and with the experimental element largely eliminated."

Mr. Porter, whose reputation is second to none as an expert concerning the recovery of potash in cement manufacture, also further said: "The cement industry is undoubtedly the chief potential American source of

potash, especially when considered in connection with the use of feldspar and other high potash minerals. Based on available information, I estimate that the mills of this country, as at present operated, are capable of producing commercially about 100,000 tons per year of potash, or about 33 per cent. of our normal requirements. The possibilities through the use of high potash materials are much greater.

"All cement materials contain some potash. As a rule, the purer limestones contain very little, say, from one-tenth to three-tenths of 1 per cent., and from this running up to 1 per cent. and over for the argillaceous limestones. Many clays and shales contain as high as 3 per cent. and 4 per cent. potash.

"In the raw mix as fed to the kilns the potash varies from about three-tenths of 1 per cent. to one-and-three-tenths per cent. in the various mills of the country. I am glad to say that the Security company stands at the top of the list and that the potash in our raw mix ranges from one and one-tenth per cent. to one and three-tenths per cent. Probably the average for the whole country will not be far from three-quarters of 1 per cent., a small percentage, to be sure, but equivalent, nevertheless, to $4\frac{1}{2}$ pounds of potash entering the kilns for every barrel of clinker made, or to 220,000 tons per year.

"The potash in the raw mix remains in the clinker and in part is volatilized in the kilns and passes out with the stack gases. The percentage of the total potash thus liberated varies in different mills and under different conditions from 25 to 95 per cent., the average under usual conditions being probably about 50 per cent. Our liberation at Security was originally about 40 per cent., but by various changes we have increased it up to a present average of over 60 per cent., and for several weekly periods have obtained as high as 70 per cent.

"We have still much to learn regarding liberation, but there is evidence that it can be increased by high lime, hard burning and by the addition of chlorides or fluorides to the raw mix. The use of calcium fluorides or fluorspar has been patented by Messrs. Huber and Reith, and is in use at the plant of the Riverside Portland Cement Co. At Security we have developed the use of common salt (sodium chloride) for this purpose, and by its use have greatly increased our liberation. I understand that a Western mill which is getting in regular operation 95 per cent. liberation is using a raw mix containing naturally about 5 per cent. salt. If this is true, their high liberation is readily explained."

"Originally at Security we caught about 95 per cent. of the dust and about 80 per cent. of the potash going to the treaters. Since we have been adding salt, however, we have not done so well on collection, because the chlorine in the gases decreases the electrical efficiency of the treater, yet we have found it very profitable to continue using salt, because the increase in liberation much more than counterbalances the decrease in collection. Besides, the new treater unit with a water film entirely overcomes the difficulty resulting from the chlorine or chlorides in the gases and a very high efficiency of collection is obtained. The water becomes saturated with potash salts, which are recovered by evaporation and crystallization. The first unit was therefore not the best type of treater to get potash, because when it was installed all treaters were designed with a view to dust collection, and the importance of obtaining the potash in a concentrated form had not been developed. As previously noted, the percentage of potash in the material collected was at first about 6 per cent.; now the average is 10 per cent., although it occasionally reaches 14 per cent., but by using the principle of selective precipitation there is no reason why it should not be brought up to 15 or 20 per cent., depending on the richness of the raw mix. It is evident that when German potash is back on the market a material containing less than 8 to 10 per cent. of potash is not likely to be considered with much favor by fertilizer manufacturers."

Mr. Porter also described in detail, as the result of the experience of the Se-

curity Cement & Lime Co., what he considered the ideal method of procedure in the collection of potash from cement dust, this being given before the members of the Portland Cement Association at its fall meeting held at Chicago last September, an outline of which is that the gases should first pass through a dry precipitator as at Security (in which 50 per cent. or more of the coarsest dust would be removed to return to the kilns), and then through a water-film treater to get the potash in solution for evaporation and crystallization, while the remaining sludge would be treated to extract the recombined potash. Such a plant would cost about \$150,000 now for one of 3000 barrels daily capacity.

He also told much about prices for product, saying, for instance, that the market price for agricultural potash was now about \$5 per unit, whereas pre-war prices varied from 60 to 70 cents per unit. The cost of collecting potash at Security was given as 22 cents per unit, not including depreciation, royalty and salt addition. The cost of the salt addition is about 25 cents per unit of potash, but it is not a necessary element of cost, and could be omitted whenever price conditions compelled.

Furthermore, Mr. Porter said that the addition of the potash plant at Security had reduced fuel consumption in the manufacture of cement. For five months in 1916, without the potash plant, fuel consumption averaged nearly 96 $\frac{1}{2}$ pounds per barrel, while for five months in 1917, with the potash plant, it averaged 87 pounds per barrel. This result has been accomplished by more careful attention to the temperatures at the back end of the kiln.

Regarding the possible use of feldspar and other high potash materials, he said that only a few existing plants could do this to advantage, because there must be a regular supply of good feldspar close at hand, and the limestone used must be high in lime. Furthermore, there must be in the limestone or elsewhere alumina or iron oxide to offset the high silica of the feldspar. Under such favorable conditions it is possible to obtain a mixture containing as much as 2 $\frac{1}{2}$ per cent. of potash and a recovery of 7 $\frac{1}{2}$ pounds of potash per barrel, which would be equivalent at prices prevailing when he made this statement to \$1.87 $\frac{1}{2}$ per barrel. Thus under very favorable conditions potash could become the principal product of a plant in value and cement take the position of a by-product.

The Security plant has been the subject of considerable observation and attention by the United States Department of Agriculture, one of its bulletins, No. 572, on the "Recovery of Potash as a By-product in the Cement Industry," containing several references to the highly successful work done there. This study, which was written by Wm. H. Ross, Albert R. Merz and C. R. Wagner, scientists in soil laboratory investigations, presents with other confirmatory details the following relating to this plant:

"It is found that under normal working conditions, and with a daily output of 2500 barrels (cement) the dust collected in the kiln stacks amounts to 16,000 pounds and in the treaters 45,000 pounds every 24 hours. The former contains on an average 4.5 per cent. potash, and the latter, as analyzed in this laboratory, 11.4 per cent., making a total of 5850 pounds of potash recovered daily. The potash lost from the kilns during the same period amounts to 6525 pounds, so on this basis of calculation the potash recovery in this plant amounts to 90 per cent. of the total. If this value be accepted as the efficiency of recovery of the potash in the most economic installations, then the total recoverable potash in the cement plants of this country under present working conditions amounts to 78,165 tons annually."

In another paragraph this bulletin said it might be estimated that the total potash (K₂O) escaping from

all the cement plants in this country as at present operated amounted to 86,850 tons in the same period.

"If it be assumed, therefore," continues the bulletin on another page, "that it would be practicable to recover or render available, say, 95 per cent. of the potash in the recoverable dust of cement plants, then the recoverable and available potash escaping from the cement plants of this country amounts approximately to 75,000 tons annually. If, however, the dust from all plants losing less than one pound of potash per barrel of cement be considered as too low grade for use as a source of fertilizer material and the figures from such plants be omitted in the calculations, then the value for the available recoverable potash in the cement industry of this country as normally operated becomes 71,000 tons annually."

With reference to these calculations a footnote says: "In the case of coal-fired plants it may not be possible, with present commercial apparatus, to render soluble as much as 95 per cent. of the collected potash, but there is no doubt that, as details of commercial apparatus are perfected, this value will represent a fair average for the different plants of the country."

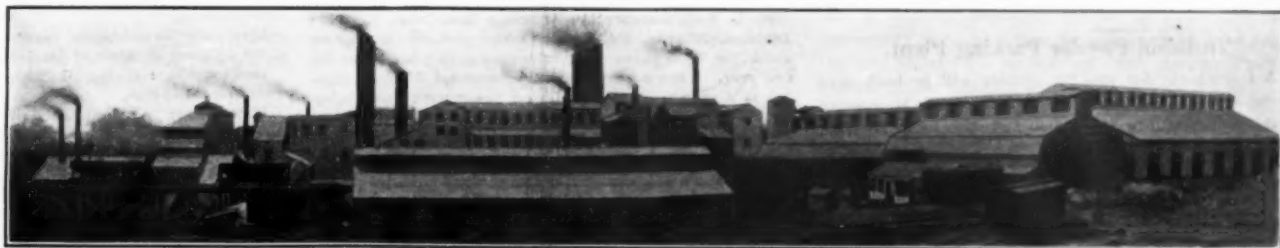
The bulletin also describes the application of salt at Security to increase the amount of potash volatilized, saying: "This is effected by adding ordinary salt, both to the raw mix and to the coal used for fuel, and in such quantity that the total added amounts to 1 per cent. of the raw mix. The salt is added in the solid state, and is brought into intimate mixture with the raw mix and coal by being ground with these materials. The quality of the resulting cement is in no sense impaired by the addition of the salt, for it is found that the total alkalis in the clinker when salt is added to the charge are actually less than when no salt is added, due to the fact that the percentage of the potash is reduced more than the percentage of the soda is increased. By this treatment the percentage of the potash volatilized, which at this plant normally runs about 38 per cent., is increased to about 65 per cent. Assuming that this percentage volatilization (65 per cent.) could be attained by chemical or other means in all plants where a lower volatilization normally prevails, then it may be estimated that the recoverable available potash in the cement plants of this country would be increased from 71,000 tons to 101,000 tons annually. In making this calculation it is assumed, as before, that 90 per cent. of the total potash volatilized is recovered, but that the additional recoverable potash is all available."

It is, therefore, apparent, in the light of all this evidence of the great and important progress made at Security in the recovery of potash as a by-product in the cement industry, that there is ample ground for expectations that the total amount of this essential chemical for agricultural purposes to be ultimately obtained in this manner will at least equal the most liberal anticipations of the earnest and energetic chemists and engineers who are devoting so much time to the study of the problems involved, and furthermore, that all expectations may be considerably exceeded when the problems are fully solved.

THE PRESIDENT SETS AN EXAMPLE FOR ALL.

On the anniversary of America's entry into the war I affirm my undivided loyalty to the cause for which we fight—the cause of justice and human liberty. I gladly lay upon the altar of the nation's need my material possessions, my bodily strength and my mental powers to serve and to save America and those ideals for which it stands and to keep the Stars and Stripes on high with honor, I pledge my hand, my heart, and my life.—Nation's pledge for Liberty Day endorsed by President Wilson

Have you made this pledge?



GENERAL VIEW OF WORKS OF SECURITY CEMENT & LIME CO.

\$15,000,000 GOVERNMENT SHIPPING STATION.

Piers and Warehouses for Baltimore River Front.

An expenditure exceeding \$15,000,000 is understood to have been decided upon for establishing a big Government shipping station on the waterfront at or near Baltimore. The War Department has been contemplating this important addition to its Baltimore district facilities, and many details are now being determined. Piers, warehouses, etc., of permanent concrete fireproof construction will be built and a 50-acre site with a water frontage exceeding 1000 feet will be utilized.

There will be large piers accommodating six of the largest type army transports, the distance between the piers to be sufficient to accommodate two vessels. This plant will handle every class of soldiers' equipment except ammunition for shipment to the American Army in France. It will employ 5000 men when it is completed, and the equipment to be shipped will include food supplies, clothing, tents, rifles, etc., but no explosives of any character.

For several weeks it has been known that the Government was considering the establishment of these extensive facilities, and its operation will add a great volume to the trade which Baltimore merchants and manufacturers are already securing because of the War Department's activities in and around Baltimore, besides adding largely to the population by the influx of employees which will naturally follow because of the needs of this great shipping station.

Plans to Dam the Rio Grande for Irrigation Purposes.

McAllen, Tex., April 18.—[Special.]—The recent organization of the Rio Grande Conservation Association, of which A. J. McColl of McAllen is president, marks the crystallization of a movement of the leading land-owners on the Texas side of the lower Rio Grande to bring about the construction of one or more dams across the international boundary stream for the purpose of conserving its surplus flow. The proposition, if put into effect, would make it possible to reclaim more than 3,000,000 acres of rich land on the American and Mexican sides of the river, it is claimed. It would also serve to cheapen very much the present cost of irrigation in that part of the lower Rio Grande Valley which now receives its water supply from the river.

The tentative plans involve not only the damming of the river at a point about 150 miles above its mouth, but the construction of a main canal on the proposed reservoir into the back country or upper regions of the valley. This main canal will connect with the existing canal systems and thus do away with the many large pumping plants that are located along the river.

On the Mexican side of the Rio Grande there is an enormous tract of vacant land that could be irrigated from the proposed reservoir or series of reservoirs. Besides the storage of water above the dam, it is proposed to utilize the resacas and natural basins that are found on both sides of the Rio Grande. These depressions will afford, it is stated, a very large storage of water. The water will be taken from the main reservoir by gravity, thus doing away with the cost of pumping. One purpose of the Rio Grande Conservation Association is to secure amendments to the treaties that are in effect between the United States and Mexico, so as to permit the diverting of the water of the Rio Grande along its lower course for irrigation purposes.

At the meeting in San Antonio at which this association was organized there were present, among many others, Judge Lucius D. Hill, one of the American members of the International Boundary Commission; H. P. Corbin, Government consulting engineer; Judge W. T. Potter, chairman of the Texas State Board of Water Engineers, and James Hays Quarles, secretary of the Texas State Board of Water Engineers.

To Build Powder Packing Plant.

A large plant for packing powder will be built near Richmond, Va., by the War Department. It is rumored that the cost will be \$3,000,000 and the completed plant will employ 3000 operatives. The site embraces 1740 acres of land in Henrico county, six miles from Richmond, and E. I. du Pont de Nemours & Co., Wilmington, Del., will operate the plant for the Government.

D. B. Teabeaut, Cuthbert, Ga., and associates will establish knitting mill.

Comments, Kicks and Commendations

In order to permit our readers to express their views on what the Manufacturers Record stands for, this page is open for suggestions, comments or criticisms.

Stirred by Its Strength of Americanism.

Chas. L. Bailey, Secretary, Hugo Chamber of Commerce, Hugo, Okla.—I enclose check for \$5.00 covering subscription of Hugo Chamber of Commerce to the MANUFACTURERS RECORD for the year 1918.

I read each issue of the MANUFACTURERS RECORD with much interest and appreciation, and I wish to say that I find nothing therein that is not strictly "my sentiments," though more clearly and emphatically expressed.

It is to be regretted that the MANUFACTURERS RECORD does not fall into more hands. More of the nation's citizenship should get the benefit of the straightforward, outspoken, unreserved manner in which you assail and denounce everything that is un-American, and support everything that is American.

Americans must be made to realize that the principle of democracy and freedom—the American principle—must be upheld in order that Christian civilization shall be maintained where it has in the past existed and established where it has never existed.

Mr. Edmonds is one of the strongest and ablest exponents of Americanism in the nation, and his true worth to this nation, and his ability is recognized by every free-born, free-thinking, God-fearing, pure-blooded American who has read what he has to say, wherever he may be.

Yours is a great work and you are performing it ably.

Rendering Valuable National Service.

C. Edwin Michael, President, Virginia Bridge & Iron Co., Roanoke Va.—We cannot fail to express our warm appreciation for the splendid example which you are setting to the country by your forceful and encouraging expressions in denunciation of Kaiserism and all that it stands for. You are, in my judgement, rendering a national and valuable service, and I most earnestly hope that you will continue to receive the commendation and support which you deserve in these fearless and effective campaigns.

Praises Completeness and Promptness of Daily Bulletin Service.

Bernard Roemer, assistant to the manager, Buy It Made In Texas Association, Dallas.—In passing for payment your invoice of April 6th covering amount of subscription to the MANUFACTURERS RECORD and Daily Bulletin service from April 15, 1918, to April 15, 1919, I must accept the opportunity offered to compliment you on the excellent service which you are giving us. We are subscribing to local clipping bureaus, and clip from 15 to 20 leading papers in the State in our own office, but neither from the bureaus nor from the papers which we are clipping do we get such authentic information relative to industrial activities in the South as we do from your Daily Bulletin, nor do we get it as quickly.

Commends Editorial Article, "For God's Sake, Hurry Up!"

H. H. Snell, manager of Lathrop Lumber Co., Birmingham, Ala.—I read the MANUFACTURERS RECORD, when I get hold of it, with a great deal of pleasure. I wish to congratulate you on the article on the front page of your March 28 issue. I have read that much of the magazine to date. I am leaving town tonight for a couple of days, and I am going to take the magazine with me and digest the inside of it on the train.

Must Get Rid of Pro-Germanism in This Country.

F. C. Groover, president Jacksonville Chamber of Commerce, Jacksonville, Fla.—I want to congratulate you upon the splendid work you are doing with your great paper. The work you are doing will live long after this war is over. The patriotism that permeates every editorial in your paper is worth while. If every paper in the country was doing the work that you are doing, we would soon get rid of pro-Germanism in this country, and it must be done, and done quickly.

An Incentive to Patriotic Action.

R. M. Hyams, Warren Bros. Company, New Orleans, La.—It is a pleasure to renew my subscription to the MANUFACTURERS RECORD, and I want to thank you for your splendid and patriotic editorials. They are certainly an incentive to every American to give the very best that is in him to help win the war.

Patriotic and Instructive.

W. L. Peel, manager the American Red Cross, Southern Division, Atlanta, Ga.—It gives me pleasure to enclose check for \$5 in payment of subscription to your paper for one year. When president of the American National Bank I was a subscriber and read your paper with great interest. It certainly has been and is now a friend to the South, and everyone should show their appreciation by taking the paper, especially as it is so patriotic and instructive.

Much Appreciated Good Wishes.

J. J. Fikles, Buena Vista, Ala.—Herewith you will please find my check for \$5 to cover my subscription to your paper for one year.

Keep up the good fight you have been making, and may

the great God of Heaven help all of us to do as well in this hour of trial.

My wife and children join me in wishing you the best success in your further efforts to help win this war.

American Interest at Heart.

L. B. Rosenfield, president Standard Welding Co., Louisville, Ky.—Your editorials are interesting. You seem to weigh out the vital points and unquestionably have America's interest at heart.

Splendid Work Commended.

J. W. Willis, General Merchandise and Manufacturer, Poulan, Ga.—I am pleased to enclose check for \$5 for one year's subscription to your journal, and trust that you may continue strong and vigorous to prosecute the splendid work you are doing for our country.

Government Will Aid in Marketing of Texas Onion Crop.

The crop of Texas Bermuda onions, which will soon be ready for market, is of large proportions, and the Bureau of Markets of the United States Department of Agriculture will make special efforts to aid these growers to market their crop so as to prevent congestion in certain market centers.

The total acreage planted in Texas in 1918, as shown by the Bureau of Crop Estimates, is 18,188 acres, as compared with 12,050 acres in 1917. Based on an average of 245 bushels to the acre, the 1918 sowing will yield 4,456,060 bushels, or 8407 carloads, carrying 530 bushels to the car. Movement of this crop began about March 25 and will continue during April and May and probably until June 15. The largest movement will occur between April 15 and May 20.

Contract for Street Cars.

Capital Traction Co., Washington, D. C., has ordered 20 semi-convertible prepayment cars from the G. C. Kuhlmann Car Co., Collingwood, O.

Good Roads and Streets

Bonds Voted.

Boonville, Mo.—Cooper county voted \$100,000 bonds for constructing rock road.

Goldsboro, N. C.—City will issue \$40,000 bonds for paving.

McKinney, Tex.—Collins county voted \$69,000 bonds for building highways.

Meridian, Miss.—Lauderdale county voted \$20,000 bonds for road construction, and the Government will add \$20,000 to this amount.

Van Buren, Mo.—Carter county voted \$75,000 bonds for road construction.

Contracts Awarded.

Bradentown, Fla.—Manatee county awarded contract for road and bridge construction for which \$196,000 is available.

Highland Park, Tex.—City awarded \$3500 contract for rock paving.

Paducah, Ky.—McCracken county awarded contract for rebuilding 7-mile highway.

St. Louis, Mo.—City awarded \$50,439 contracts for alley paving.

Washington, D. C.—City awarded \$6900 contract for street grading.

Contracts to Be Awarded.

Carrollton, Ga.—City is having plans and specifications prepared for 20,000 square yards of paving, for which \$50,000 is available.

Charlottesville, Va.—Virginia State Highway Commission receives bids until May 7 for constructing 3 miles of highway.

Florence, Ala.—Lauderdale county plans \$50,000 expenditure for building highway to Muscle Shoals.

Fairfax, Va.—Virginia State Highway Commission receives bids until May 6 for constructing from 3 to 5 miles of highway.

Fort Worth, Tex.—City will pave 5 blocks of street at a cost of \$16,493.

Henderson, Ky.—Henderson county plans to construct 10 miles of highway.

Harrison, Ark.—Boone county opened bids April 18 on constructing 37 miles of macadam highway with bridges and culverts.

Kosciusko, Miss.—Attala county receives bids until May 6 for building 20 miles of sand-clay roads.

Madisonville, Ky.—Hopkins county will expend \$16,000 for road improvements.

Manchester, Tenn.—State Highway Department receives bids until May 13 for constructing 6 miles of highway.

Mountain Home, Ark.—Baxter county plans building 25-mile highway.

Nevada, Mo.—Vernon county receives bids until May 7 for 17-mile road construction with culverts.

Rockville, Md.—Montgomery county receives bids until May 7 for 21,000 square yards of concrete road construction.

Tusculum, Ala.—Colbert county plans expending \$50,000 for constructing road to Muscle Shoals.

The Iron, Steel and Metal Trades

Steel Production Now at Former Level.

New York, April 22—[Special.]—Production of iron and steel throughout the United States is now fully equal to the average of 1916 and 1917. There has been a complete recovery from the curtailment of last winter. Any further increase in production that may now occur will represent an excess of previous averages. The actual capacity of the steel plants at present is between 15 and 20 per cent. in excess of that of two years ago. Coke supplies slightly increasing during the past week, particularly through the Connells-ville region being furnished more cars than heretofore. Labor scarcity is commencing to be felt at a few steel mills, but it is not a serious problem, thus far at least.

A question of interest that is occupying the attention of the trade at present is: Where is the steel going? Capacity in finished rolled steel is 33,000,000 gross tons a month. Production at present is more than 2,500,000 tons. Shipments in the United States have not yet reached 10 per cent. of this amount. Steel shipments are not even 5 per cent. There is practically no new construction for ordinary peace purposes. Operations of many commercial consumers are restricted because they cannot obtain the steel. No steel can be observed accumulating at any point, and mills have been reducing their stocks of late with better car supplies. Exports have not increased, and are being made largely out of accumulation that have lain at seaboard for months.

It is clear that the War Industries Board made no mistake in reaffirming steel prices to June 30. The market shows no disposition at any point to shade set prices. If expectations of such an event were entertained the time limit for their fulfillment must be extended.

It is very difficult to purchase sheets at all, and almost impossible to buy for any delivery. Nearly all sellers appear to be sold up for about three months, while they are indisposed to sell for any early delivery. Requirements for sheets are fully as heavy as was expected, if not heavier. So far as Government demands are concerned, they are proving heavier than was anticipated. The theory was recently entertained in many quarters that within a few months the Government would be well over the high point in sheet buying. Experience since then, however, shows that no limit can be set, for new requirements are continually coming up. Government allotments in sheets within the past few weeks have been fully up to the average for months past.

Finished steel products are no more plentiful in the open market than heretofore. Only early deliveries are sought, and as a rule they cannot be had. In the past week or so there has been a much larger volume of steel shipped on commercial contracts than was the case in January and February. Within the past week there was no further increase, if indeed there was not a decrease. There has been a decrease in plates, as the mills have been carrying out instructions from Washington to ship maximum tonnages, possible for account of the Emergency Fleet Corporation.

Government orders continued large last week, and new requirements were constantly making their appearance, enlarging the appraisal of war demand. For some time past the steel trade has followed more or less a theory that preparation for waging war involved certain large tonnages of steel, and that when they were out of the way there would not be corresponding new needs arising. Nearly every week, however, requirements come out that were unexpected, disclosing new ways of using steel for prosecuting the war.

There has been so much reselling lately of steel originally bought for export, and so much of the material actually exported in recent months has been made up from stocks already at seaboard, that export requirements for the next two months have been rather lightly regarded as a matter of mill production. The latest view is that there will be more vessel capacity than was expected and definite information has been circulated as to there being larger requirements on the part of our Allies, and rather pressing ones at that than has lately been assumed. It now seems probable that in a few months there will be record exports of steel, made up chiefly of mill shipments, and not drawn from the accumulations at seaboard as formerly.

New buying in pig iron was very light last week.

There were heavy forward engagements before price fixing was undertaken, and there are very large unfilled contracts still. Buying for distant future, of course, could not be expected at this time. Very little steel making iron is obtainable in the Eastern territory at present. There are a few inquiries in the market from steel companies, including one lot of 10,000 tons of low phosphorus for shipment this year beginning in May, and another lot of 12,000 tons for shipment over the second half of the year. One Eastern Pennsylvania furnace, which sold about 90,000 tons in March, is now accepting no contracts except from consumers engaged in war work, directly or indirectly. Virginia furnaces have taken some additional contracts from consumers in this territory for shipment during the second half of the year, who bought fair tonnages for shipment over the first half of the year. In general these furnaces are reluctant to accept orders.

Quiet Conditions Continue in Metal Markets.

New York, April 22—[Special.]—Quiet conditions continued to prevail in the metal markets last week, with no features of interest developing anywhere.

The copper market was quiet and unchanged, with no new developments to note. Reports from copper producing companies being received continue to present no argument for a higher price for the metal being fixed. The agitation that has been going on to induce the Government to raise the price of copper after June 1 is regarded in many quarters as a counter offense to any petitions that may be made for a lowering of the price. In other words it is figured that asking for higher prices will stop the possibility of a reduction and help to insure a continuance of the 23½ cent price.

There has been no change in the lead situation. The shut down of an important independent producer last week has apparently caused no shortage of supplies, either for Government work or ordinary consumption. Lead was freely offered last week for prompt or future shipment at 6.75 cents, St. Louis, with rumors that this price had been scalped on May shipment. Spot lead in New York continues to bring 7.12 cents from independents, and 7 cents from the American Smelting & Refining Company.

In 1916 and the early part of 1917 dealers and operators had a very large interest in spelter. It is no exaggeration to say that there were occasions when they were long of the market to the extent of 50,000 tons. Most of these speculative accounts were liquidated last year, and operations since then have been of a minor character. It would be unsafe, however, to believe that the speculative interests in spelter have gone for good. There have been signs lately that operators considered spelter to be cheap enough to buy and hold for a rise. This influence may be a factor in the market before a great while. Consuming demand was dull last week. Sellers say it is difficult to obtain orders for prime Western above 6.75 cents, St. Louis, for April, or 6.80 cents for second quarter.

The tin market also remains unchanged. There being no market on Straits tin, however, other kinds of tin are constantly advancing, and it is reported that for No. 1 Chinese tin, high as 91 cents has been asked for and obtained.

Dullness in Southern Pig-Iron Market.

Birmingham, Ala., April 22—[Special.]—The Southern pig-iron market is simply marking time; that is, the manufacturers are not making effort to sell and are taking orders in small tonnages and from regular customers or friends, as it were. Local consumers have been in the market lately, but their orders have been in small lots and for delivery during the latter part of the year. Inquiries are still being received from various sections of the country, and there is no change in the opinion here that an iron famine is impending for this year. Production in the South is showing improvement right along. At those furnaces in blast there is a better output, while during the coming month additional furnaces are to go in. Delivery is but little better. Congested gateways are not permitting full delivery either to the East or the Middle West.

E. N. Rich of Baltimore, president of the Alabama Company, made a thorough inspection of properties of the company in this district during the past week, visit-

ing furnaces, ore and coal mining and other works. The second Gadsden furnace, which has been under repairs for some little time, is now being dried out and will be placed in commission in the next week or so. This company is well sold into the third quarter of the year, though a few orders are being taken on from time to time.

Home consumption of pig-iron shows but little improvement. Cast-iron pipe companies are still waiting an impetus in the buying. A few small-sized orders have been coming in recently, but the aggregate is not sufficient to warrant all confidence in this trade returning. The Government is to get some cast-iron pipe for use at navy-yards and elsewhere.

Foundries and machine shops are working steadily, and announcement of intentions by the National Labor Board to investigate the strike of the metal trades crafts in this district, now on for several weeks to bring about the eight-hour day, does not bring about apprehension here. Recent purchases of iron by foundries and machine shops would indicate there will be steady work for some time.

Further adjustment in wages at coal mines is looked for during the coming month, and this will have a result of bringing about steadier work on the part of the employes, it is believed. The coke production is still picking up, but it is realized that the maximum production in this line will shortly be reached and new coke ovens are necessary. The Tennessee Coal, Iron & Railroad Co. is now working on foundations for the addition of 154 coke ovens to the by-product plant at Fairfield, near here. The coke market is similar to that of the iron market, producers not being able to take on much business, even if they wanted to.

Announcement is made that the Shelby Chemical Co. has begun the erection of a \$600,000 hardwood by-product plant at Shelby, Ala., in connection with the blast-furnace properties of the Shelby Iron Co., which operates two stacks, one on charcoal and the other on coke. By-products of the new plant have already been sold—wood alcohol, acetone and acetate of lime. The plans call for completion of the new works in August. Charcoal will be used in the furnaces.

The scrap iron and steel market in the Southern territory is rather quiet. There is but little inquiry, and old material is not altogether as voluminous on the yards as before. Southern consumers are not paying the maximum price fixed by the Government, and the dealers have not been able to pay the gatherers of country scrap the price that has prevailed before this. No brokerage or other commission has been allowed in the South, and consequently prices have had to carry the whole transactions. Some of the dealers in scrap iron and steel are still complaining of shortage of labor. Where negro women were brought into use in sorting scrap much success is noted, but it is hardly believed that this can be kept up for any length of time. The Jaffe Iron & Metal Co. has 218 negro women working on its yards sorting out the scrap, and will keep the greater number of them working as long as there is stock on the yard. The stocks are beginning to dwindle.

Quotations for pig-iron and scrap iron and steel in the South are as follows:

PIG-IRON.

No. 2 foundry, \$33 to \$33.50 f. o. b. furnaces. Basic iron, \$32; revision by Government set for July 1, 1918, again; differentials on pig-iron same as before.

OLD MATERIALS.

Old steel axles.....	\$30.00 to \$32.00
Old steel rails.....	27.00 to 30.00
Heavy melting steel.....	23.00 to 25.00
No. 1 railroad wrought.....	26.00 to 27.00
No. 1 cast.....	23.00 to 25.00
Stove plate.....	20.00 to 22.00
Old car wheels.....	25.00 to 28.00
Tramcar wheels.....	21.50 to 24.00
Machine-shop turnings.....	17.00 to 18.00
Cast-iron borings.....	12.00 to 13.00

\$1,350,000 for Earthwork Construction.

Final plans and specifications have been accepted for constructing levees and drainage canals for Mississippi County Drainage District No. 17, J. L. Russell, secretary of drainage directors, Blytheville, Ark. The estimated cost of constructing the earthwork is \$1,350,000, and proposals are to be received until May 9. Pride & Fairley of Blytheville are the engineers in charge.

Lumber Manufacturers Postpone Annual Meeting.

The National Lumber Manufacturers' Association announces the postponement of the sixteenth annual meeting, which is now scheduled to be held at the Congress Hotel, Chicago, Ill., May 20-21. The program is the same as originally planned.

RAILROADS

\$350,000,000 FOR CARS AND ENGINES.

Federal Railroad Administration Will Let Huge Contracts for New Equipment.

The Federal Railroad Administration will, according to a report from Washington, place a large order for locomotives within two weeks. Altogether, it is stated, about 2000 engines will be purchased this year, and the first contracts may total one-half of this number.

Orders for 100,000 freight cars of various types, it is also announced, will be placed before any of the locomotive contracts are awarded, perhaps immediately, and they will include box cars, gondolas and drop-bottom hopper cars from 50 to 60 tons capacity.

It is estimated that these contracts will total about \$350,000,000, and that they will be distributed among about 15 leading car and engine builders.

It is said that the cars will contain a larger proportion of wood in their construction than has been usual of late years, so that steel may be saved for construction in which it is more urgently required at present than for railroad equipment.

BIG TRAFFIC ON ROCK ISLAND.

Gross Nearly \$90,000,000, But Expenses Increase Heavily as Well as Taxes.

The annual report of the Chicago, Rock Island & Pacific Railway Co. for the year 1917 shows that the total operating revenues were 11 per cent. larger than they were in 1916, but operating expenses increased practically 20 per cent., so that there was a decrease in operating income of about 12½ per cent. The balance to profit and loss also displayed a heavy decline.

The income statement shows the following: Total railway operating revenues, \$89,608,722; increase as compared with 1916, \$8,719,593; total operating expenses, \$66,046,104; increase, \$10,954,387; net operating revenue, \$23,562,617; decrease, \$2,234,795; total operating income after taxes and uncollectible revenue, \$19,193,048; decrease, \$2,799,295; total income, \$20,622,243; decrease, \$2,806,441; balance for dividends, \$7,527,145; decrease, \$551,044; balance to profit and loss after dividends, \$5,747,372; decrease, \$2,330,818, this decline being due mainly to the resumption of dividends, which amounted to \$1,779,773.

It is noted that the Adamson law resulted in increasing wages \$1,275,000 on the lines of the system. Taxes were 15 per cent. more.

Difficulty was experienced in obtaining equipment. An order for 30 locomotives was placed two years ago and their delivery was expected in the latter part of 1917, but on account of the war that expectation was not realized. It is now thought that they will be received from the builders by June 1.

Industrial prosperity continued along the lines of the company, and 117 tracks to serve private enterprises were built during the year.

Total assets of the company are \$392,760,360, an increase of \$21,206,866.

Norfolk & Western May Spend \$1,000,000.

Work has started at Bristol, Va., on the yard improvements of the Norfolk & Western Railway, and, although the first contracts total only about \$170,000, according to preliminary announcement, it is estimated that an aggregate of about \$1,000,000 will be expended before the company completes its plans for the general improvement of its facilities there.

Besides the enlargement of the yards, the work already outlined provides for the erection of a 16-stall roundhouse, which may when required be enlarged to house 24 locomotives; a machine shop, a reinforced concrete overhead bridge and a reinforced concrete underpass.

Boxley & Haley of Roanoke, Va., are the contractors, and they have established an office at 821 Washington street, in Bristol. The yards will have 12 tracks when the work is completed. All is to be done by January next.

Thousands of Women in Railroad Work.

There are now more than 6500 women employed by the Pennsylvania Railroad Co. on its lines east of Pittsburgh alone, or an increase of over 5000 since May 1 of last year, when advertisements were published inviting women to apply for various position vacated by

men who had gone to war or else gone to engage in war industries. This army of women is employed at 61 different kinds of work, although most of them are acting as clerks and stenographers, there being more than 3500 in such office capacities. A few are employed merely at typewriting without stenography. Others are telephone operators, messengers and assistants, while nearly 300 are engaged in doing the heavy work of track laborers. Still others are doing arduous work in machine shops, and some are house painters. There are 20 employed at draughting. A very few are either operating turntables for locomotives or acting as power operatives in electric plants. One is a coal inspector. Generally, it is said, all of these women are filling their places satisfactorily.

North Carolina Demands Rate-Basing Ports.

An organization known as the Greater North Carolina Association was formed recently at Fayetteville, N. C., with S. A. Jones, of Waynesville, N. C., as president, and resolutions were unanimously adopted asking the President of the United States to instruct the Director General of Railroads, as a war measure, to declare the Cape Fear River ports, Fayetteville, Wilmington and Southport, to be rate-basing ports, also recommending that a South American mail line be operated out of Wilmington and that a naval coaling station be established at Southport or some equally available point on the Cape Fear River. The resolutions were sent to the President and Mr. Jones says that receipt was acknowledged and that they were referred to the Director General for action. He also remarks that the purpose of the resolutions is to stop freight rate discrimination in the State; that North Carolina asks to be put on the same per mile rate which her sister States enjoy. Discrimination, he says, is costing the people of the State \$15,000,000 a year.

Murrell Buckner Leaves Dallas Terminal.

Murrell Buckner, secretary-treasurer and superintendent of the Dallas Union Terminal Co., of Dallas, Tex., will, according to a report from there, retire from those positions on May 1 to become president of the Southern Leaf Tobacco Company with headquarters at Nashville, Tenn., but with offices also in Louisville, Ky., and New York City. Mr. Buckner has been prominently connected with the Dallas Union Terminal ever since its beginning, having been elected secretary in 1912 and treasurer in 1914. Two years later he became superintendent. He was active in the work of promoting and organizing the enterprise in connection with F. G. Pettibone its president. It is said that the offer of the presidency of the Southern Tobacco Co. was made to him several years ago, but that he would not accept it until his work at Dallas was fully complete.

Improvements at Tulsa, Okla.

The new terminals of the Santa Fe system at Tulsa, Okla., which, as hitherto announced, will cost approximately \$2,000,000, will include a new passenger station of brick and reinforced concrete, 137½x40 feet, with a wing 90x33 feet, a freighthouse 350 feet long and two stories high, besides other facilities. The terminals, including the yards, will cover about three blocks of ground. Work has begun. The yard tracks will total 10 miles in length, and they will accommodate about 1000 cars. An electric interlocking signal system will be installed. C. E. Briggs is engineer in charge.

To Strictly Punish Theft on Railroads.

A bureau has been established in the Division of Law of the Federal Railroad Administration to rigidly enforce the United States statute against theft of property in transit on railroads, which provides a maximum penalty of 10 years' imprisonment for anyone convicted of stealing from either a car, a station or any other railroad property. Philip J. Doherty has been appointed manager of the bureau, with headquarters at Washington, D. C.

Missouri Pacific's Large Increases.

The published statement showing the result of operations of the Missouri Pacific Railroad Co. for the year 1917 gives the total operating revenues as \$78,320,313; increase as compared with 1916, \$8,347,501; operating expenses, \$53,248,038; increase, \$1,905,641; net revenue, \$25,072,275; increase, \$6,441,860; operating income, \$20,828,963; increase, \$5,202,310; total income, \$22,290,877; increase, \$5,329,352; surplus, \$8,965,104; increase, \$8,006,090.

TEXTILES

Acworth Hosiery Mills.

From 30 to 40 knitting machines with electric power drive, costing \$16,000, will be installed by the Acworth (Ga.) Hosiery Mills, the daily output to be 200 dozen pairs of hose. This company has been organized with \$20,000 capital by W. F. Hetrick of Gainesville, Ga., recently mentioned as planning the enterprise, and associates. Mr. Hetrick is vice-president and the other officers are: R. L. McMillan, president; L. M. Awtrey, secretary; J. E. Carnes, treasurer; all of Acworth. A 40x80-foot brick-construction building will be erected at a cost of \$3200, and the plant will employ 17 operatives when in operation.

Liberty Hosiery Mill.

Men's half-hose, 300 dozen pairs to be the daily capacity, will be manufactured by the Liberty Hosiery Co. of Rock Hill, S. C. This company will be organized with \$25,000 capital by J. C. Cauthen, who has leased a building and will install 50 knitting machines with electric power drive. The equipment has been purchased and the mill will employ 30 operatives.

Textile Notes.

John Banner of Mt. Airy, N. C., is reported as to establish a hosiery knitting mill.

An increase of capital from \$220,000 to \$440,000 has been announced by the Texas Cotton Mill Co., McKinney, Tex.

C. P. Fox, A. L. McArthur and P. A. Staley, Staley, N. C., have incorporated the Staley Hosiery Mills with \$50,000 capital.

Recently chartered with \$200,000 capital, the Pocahontas Cotton Mills of Petersburg, Va., has leased the mill of the Virginia Consolidated Milling Co. There are 7200 spindles and 186 looms in the plant. The company's officers are: President, F. L. Robbins; vice-president, Leon Lowenstein; secretary-treasurer, Josiah L. Canter.

An increase of capital from \$200,000 to \$500,000 has been decided upon by the Norwood (N. C.) Manufacturing Co., manufacturer of cotton products. This corporation will build an addition intended for the installation of carding machinery with the electric-power drive, which new equipment will enable the management to eliminate night operations. The machinery contracts have been signed and the new machinery will be placed in a \$15,000 additional building. Standard mill construction, 112 feet long by 75 feet wide, has been adopted for the addition, plans and specifications having already been prepared. D. B. Coltrane of Concord, N. C., is president and treasurer of the Norwood Manufacturing Co., and J. F. Shinn of Norwood is its secretary.

New Alabama Wood Chemicals Plant.

Wood chemicals, to include alcohol, acetone and acetate of lime, will be manufactured by the Shelby Chemical Co., Shelby, Ala., which has been organized under Government supervision by Morris W. Bush of Birmingham, president of the Shelby Iron Co., and associates. Detailed plans for buildings have been completed, construction has been ordered and equipment of machinery has been secured. The daily consumption of this plant will be 160 cords of hardwood, and the product will be purchased by the Government for use in the manufacture of munitions. The charcoal remaining from the wood burning will be used by the Shelby Iron Co., in its furnaces at Shelby.

\$3,000,000 Coal Company Chartered.

Another big coal-mining enterprise has been chartered for West Virginia developments, the capitalization being \$3,000,000. It is the Federal Coal Co., with offices at Charleston and coal land in the Sherman District of Boone county, West Virginia. The incorporators are H. R. Van Dusen, William Hall and E. Johnston of Charleston, W. Va.; Judson E. Harney of Scranton, Pa., and John E. McCully of Philadelphia, Pa.

The National Association of Hosiery and Underwear Manufacturers will hold its fourteenth annual convention and knitting arts exhibition at Philadelphia May 20 to 24.

Construction Department

IN ORDER TO FOLLOW UP

Properly the Construction Department items, please bear in mind the following statements:

EXPLANATORY

The MANUFACTURERS RECORD seeks to verify the items reported in its Construction Department by full investigation. It is often impossible to do this before the item must be printed or else lose its value as news, and in some items it is found advisable to make statements as "reported" or "rumored," and not as positive information. If our readers will note these points they will see the necessity of the discrimination. We are always glad to have our attention called to errors that may occur.

HOW TO ADDRESS

The name of one or more incorporators of a newly incorporated enterprise should always be written on letter addressed to the official headquarters or to the town of the parties sought, as may be shown in the item. Sometimes a communication merely addressed in the corporate or official name of a newly established company or enterprise cannot be delivered by the postmaster. By following these general directions the post-office will generally be enabled to deliver your mail promptly, although it is inevitable that some failure by the postal authorities to deliver mail to new concerns will occur, as our reports are often published before new companies are known and before they have any established office for the receipt of mail.

WRITE PERSONAL LETTERS

In communicating with individuals and firms reported in these columns a letter written specifically about the matter reported will receive better and quicker attention than a circular. In most instances a return postal card or addressed and stamped envelope should be enclosed with letter.

In correspondence relating to information published in this department, it will be of advantage to all concerned if the Manufacturers Record is mentioned.

DAILY BULLETIN

The Daily Bulletin of the Manufacturers Record is published every business day in order to give the earliest possible news about new industrial, commercial, building, railroad and financial enterprises organized in the South and Southwest. It is invaluable to manufacturers, contractors, engineers and all others who want to get in touch at the earliest moment with new undertakings, or the enlargement of established enterprises. The subscription price is \$25 per year.

All advertising contracts in the Manufacturers Record for three months or longer include a subscription to the Daily Bulletin for the contract period, as well as a subscription to the Manufacturers Record.

AIRPLANE PLANTS, STATIONS, ETC.

Okla., Dewey — Aeroplanes. — Safety Aero-plane Mfg. Co. organized; A. J. Poncelet, Prest.-Mgr.; J. S. Denson, Secy.; both of Dewey; D. N. Massey, V.-P.; McLenn, Tex.; temporarily using city building; plans not completed for new building; install equipment including gasoline engine, band saw, welding outfit, press, drill, lathes; manufacture aeroplanes; produce first plane about Sept. '15. (Lately noted, inceptd., capital \$150,000.)

BRIDGES, CULVERTS, VIADUCTS

Fla., Bradenton. — Manatee County Comms., Wm. M. Taylor, Clerk, let contract to R. A. Miller, Palmetto, to build bridges in connection with 25 mi. road construction, Palmetto Special Road & Bridge Dist. (See Road and Street Work.)

Fla., Bradenton. — City of Bradenton, Harry Wadham, Commr. Public Works, and City of Palmetto, L. G. Wingate, Commr. Public Works, ask bids until May 14 to construct bridge across Manatee River; wood construction; length, 1 mi.; width, 18 ft.; 2-leaf bascule steel draw span with 75-ft. openings. Lately noted to cost \$60,000; City of Bradenton to vote Apr. 30 on \$45,000 bonds. (See Machinery Wanted — Bridge Construction.)

Fla., Chattahoochee. — Gadsden County, F. F. Morgan, Clerk County Court, Quincy, Fla., voted \$30,000 bonds for construction of bridge across Apalachicola River near Chattahoochee; Jackson County to pay similar amount; balance of cost by U. S. Government; date of receiving bids not set. (Under Marianna, bridge lately noted to be of steel construction.)

Fla., Milton. — Santa Rosa County Comms., H. W. Thompson, Clerk, Circuit Court, will construct bridge across Blackwater River; let contract May 14. (See Machinery Wanted — Bridge Construction.)

Ga., Dalton. — Whitfield County Comms. will construct concrete bridge over Bowie Branch.

Md., Leonardtown. — St. Mary's County Comms. have \$20,000 from Legislature for bridge to connect St. George's Island with mainland of St. Mary's County.

Tex., Claiborne. — Kent County will construct reinforced concrete slab across Salt Fork of Brazos River at O-O crossing; contain 3750 sq. yds. concrete; also 40 cu. yds. reinforced concrete culverts; bids opened Apr. 22; B. P. Vardiman, County Judge.

Tex., Houston. — Harris County will construct bridge at Atascocita crossing on Sar Jacinto River; bids opened Apr. 24. (See Road and Street Work. (See Machinery Wanted — Road and Bridge Construction.)

Va., Bristol. — Norfolk & Western Ry., J. E. Crawford, Ch. Engr., Roanoke, Va., will construct bridges in connection with enlargement of yard facilities. (See Ry. Shops, Ter. Roundhouses, etc.)

W. Va., Parsons. — Tucker County Comms., H. F. Colebank, Clerk of Court, have plans and specifications for constructing bridge (lately noted) over Roaring Run, between Parsons and Hambleton; 54-ft. span; steel girder construction; county to furnish girders; bids until May 7. (See Machinery Wanted — Bridge Construction.)

CANNING AND PACKING PLANTS

Fla., Oldsmar. — Kogge Canning Co., Tampa, Fla., R. No. 3, organized; Wm. Kogge, Prest.-Mgr.; Tampa; Mrs. Wm. Kogge, Secy.; establish plants at Oldsmar and Tampa, Fla., and Wapahoneta, O.; erect \$500 building at Oldsmar; lease other buildings; contemplated daily production, 10,000 cans at Oldsmar, 500 to 1000 at Tampa, 5000 at Wapahoneta. (See Machinery Wanted — Canning Machinery, Etc.)

Fla., Tampa. — Kogge Canning Co., R. No. 3, will establish canning plant of 500 to 1000 cans daily capacity. (See Fla., Oldsmar.)

La., New Orleans. — Hoth Bros., Alabo and North Peters Sts., will build meat-packing plant to cost \$35,000 or more; erect reinforced concrete structure with 6-ft. walls; ordered packing machinery from St. Louis.

Md., Baltimore. — Roberts Bros., Wolfe and Preston Sts., let contract P. J. Cushman, 217-219 St. Paul St., Baltimore, to erect cannery; factory, 45x86 ft.; boiler-house, 20x20 ft.; warehouse, 65x86 ft.; all 1 story, brick; cost \$13,065; plans by J. Franklin Nelker, 209 Professional Bldg., Baltimore. (Lately noted.)

Mo., St. Louis. — Best Clymer Mfg. Co. will erect addition to factory; cost \$15,000.

S. C., Gaffney. — R. J. Brown organized company to enlarge established plant; ordered additional machinery.

S. C., Holly Hill. — Liberty Canning Co. organized; M. L. Breeland, Prest.; S. E. Felder, V.-P.; John G. Kelly, Secy.; open bids in July to erect 40x50 ft. ordinary construction building; Clemson College plans; purchased canning machinery; tomatoes, etc.; daily capacity 800 cans. Lately noted chartered. (See Machinery Wanted — Boiler.)

Va., Crockett. — Dix Canning & Kraut Co., capital \$30,000, inceptd.; John S. Dix, Prest.; Jas. M. Miller, Secy.

CLAYWORKING PLANTS

Fla., Bradenton. — Pottery. — Manatee River Pottery Co., capital \$10,000, inceptd.; establish pottery and manufacture articles from plastic clay deposits along Manatee River; H. S. Glazier, Prest.; E. B. Hubell, V.-P.; S. A. Bean, Secy.; Mrs. Mary H. Ward, Gen. Mgr.; all of Bradenton; Katherine McClellan, Treas., Sarasota, Fla.

Fla., Miami. — Bricks. — Peter E. Barnett, Box 157, contemplates installation of clay brick machinery. (See Machinery Wanted — Brick Machinery.)

Fla., Miami. — Bricks. — Caldwell Brick Co. organized; Jos. A. Caldwell, Prest.; Fred Dulaney, V.-P.; Wm. E. Eberhardt, Secy.; Treas.; leased brick plant in South Bristol; present daily capacity 20,000 shale bricks. (Caldwell and Eberhardt lately noted to have leased brick plant and planning to install additional machinery increasing daily capacity to 50,000 bricks.)

COAL MINES AND COKE OVENS

Ala., Gadsden. — Cherokee Coal Co., capital \$10,000, inceptd.; Lee W. Murphy, Prest.; J. S. Brown, V.-P.; both of Gadsden; W. J. Martin, Secy.-Treas., Altoona, Ala.; estimated daily capacity 100 tons; no machinery needed.

Ky., Hamden. — Clinton Coal Co. organized by A. M. Gross, D. C. Combs and others of Hazard, Ky.; leased coal properties on Carr's Fork and will develop; establish townsite; D. Y. Upton, Mgr.

Ky., Middlesboro. — Hawley Coal Co., W. E. Price, Prest., lately noted increasing capital from \$300 to \$50,000, develops 100 acres; daily output 100 tons.

Ky., Samoset. — Samoset Fuel Corp., capital \$30,000, organized; G. M. Barger, Prest.; W. J. Cole, Secy.-Treas. and Gen. Mgr., both of Bluefield, W. Va.; W. B. Morton, V.-P., Graham, Va.; leased several hundred acres coal land near Baltimore & Ohio R. R. and Big Sandy extension of Chesapeake & Ohio Ry.

Ky., Whitesburg. — P. W. Wheeler, Hazard, Ky., leased coal lands in Rockhouse Creek fields, Letcher County; develop.

Ky., Whitesburg. — Elkhorn Superior Block Co. will enlarge and improve plant; install electrical machinery and establish additional townsite in Boone's Fork field; increased capital from \$25,000 to \$100,000.

Md., Baltimore. — Wright & Gibson Co., Pittsburgh, Pa., will erect coal tipple, sheds and buildings.

Okla., Porumo. — Betsy Ross Coal Co., capital \$50,000, inceptd. by Tom Taylor, H. R. Plunkett and Ralph Reed.

Tenn., Knoxville. — Bowling Coal Co., capital \$20,000, inceptd. by H. B. Lidsay and others.

Tenn., Nashville. — White Oak Coal & Land Co., capital \$30,000, inceptd. by Lee Schwartz, Morris W. Ellis, Wm. Hume and others.

Va., Norton. — Hurt Coal Co. organized; T. V. Hurt, Prest.-Mgr.; J. P. Hurt, V.-P.; C. W. Johnson, Secy.-Treas.; develop 35 acres; daily output 50 tons; no machinery needed. (Lately noted inceptd., capital \$10,000.)

Va., Roanoke. — Pocahontas Coal & Iron Corp., capital \$100,000, chartered; J. H. Dunkley, Prest.; T. W. Fugate, Secy.

W. Va., Germania. — Cover Coal Co., Piedmont, W. Va., lately noted inceptd., capital \$20,000, by P. S. Fahey and others, has not elected officers; develop 500 acres; estimated daily output 300 tons; Wm. Harvey, Constr. Engr., Frostburg, Md. (See Machinery Wanted — Mining Machinery.)

W. Va., Stollings. — Carr & Hall Coal Co., capital \$500, inceptd. by W. H. Hall and Mary K. Hall of Huntington, W. Va.; A. D. Carr of Logan, W. Va., and others; develop coal mines in Logan County.

W. Va., Wheeling. — Consumers Coal Co., capital \$50,000, inceptd. by C. E. Peters, Edward Peters, Frank Hicks and others.

COTTON COMPRESSES AND GINS

La., Vinton. — Carter and Thompson of Lake Charles, La. (represented by D. O. Vincent of Vinton), will build \$15,000 3-stand cotton gin, girts mill and rice mill.

Tex., Abilene. — George Finberg Co., capital \$250,000, inceptd. by Geo. Finberg, G. W. Jackson and H. G. Haynie.

Tex., Italy. — Italy Compress Co. increased capital from \$10,000 to \$60,000.

COTTONSEED-OIL MILLS

Tenn., Memphis. — Valley Cotton Oil Co. increased capital from \$60,000 to \$150,000.

Tex., Celina. — Farmers' Cotton Oil Co. increased capital from \$42,000 to \$75,000.

Tex., Fort Worth. — Traders' Oil Mill Co. (B. W. Couch and others) let contract Butcher & Sweeney of Fort Worth to erect 2 concrete buildings for cottonseed oil mill. (Lately noted inceptd. with \$150,000 capital.)

DRAINAGE SYSTEMS

Ark., Blytheville. — Mississippi County Drainage Dist. No. 17, will construct levees and drainage canals; estimated cost of earthwork, \$1,350,000; bids until May 9; Pride & Fairley, Engrs., Blytheville; J. L. Russell, Secy. Drainage Directors. (See Machinery Wanted — Drainage System.)

Miss., Greenville. — Black Bayou Drainage Dist. of Washington County will clear about 700 acres in natural channels; bids until May 13; Morgan Engineering Co., Engr., Memphis, Tenn.; O. C. Kulicka, Secy. of Dist. (See Machinery Wanted — Drainage Construction.)

Mo., Chillicothe. — Drainage Dist. No. 26 of Livingston County will construct canal; 1100 ft. long; 6 ft. wide on bottom; 12,000 cu. yds. excavation; bids until May 15; Fred H. Harris, Clerk County Court. (See Machinery Wanted — Drainage Construction.)

Mo., Kennett. — Elk Chute Drainage Dist. organized; plans to construct drainage system to reclaim about 40,000 acres in Dunklin County and 10,000 in Pemisec County.

ELECTRIC PLANTS

Ala., Headland. — City voted \$10,000 bonds to improve electric and water power. Address The Mayor.

Ala., Jasper. — Alabama Public Service Co., capital \$300, inceptd. by F. L. Fuller, E. T. Rice and N. H. Prickett.

Ga., Commerce. — City, C. A. Goodin, Clerk and Treas., voted \$15,000 bonds to install and equip electric light and power plant; contracted for machinery and material; has pole-line equipment; T. C. Hardman, Chron. Light Committee; L. F. Brooks, Supt. (Lately noted.)

Mo., Ottumville. — Jesse Straten will install lately-noted electric-light plant at cost of \$6500. (See Machinery Wanted — Electrical Equipment.)

Tex., Clyde. — Robt. Cook will install electric-light plant; purchased equipment.

Tex., Nixon. — Nixon Electric Light & Power Co., capital \$12,000, inceptd. by J. F. Wood, Jr., W. L. Hoover and C. T. Moore.

FERTILIZER FACTORIES

S. C., Estill. — Estill Enterprise & Fertilizer Co., capital \$50,000, inceptd. by M. H. O'Neal, S. M. Clark and A. W. Lawton.

FLOUR, FEED AND MEAL MILLS

Ga., Cuthbert. — D. B. Teabaut and others will establish flour mill, grain elevator and knitting mill; cost \$125,000.

Ky., Paducah. — Lack-Redford Elevator Co., 2nd. and Tennessee Sts., will open bids not later than May 1 to construct 26x40-ft., 4-story brick mill-construction building, cost \$7000; install (Wolf) corn mill equipment; cost \$10,000; daily capacity 600 blbs. meal. (Lately noted.)

La., Vinton.—Carter and Thompson of Lake Charles, La. (represented by D. O. Vincent of Vinton), will build grists mill. (See Cotton Compresses and Gins.)

Mo., Kansas City.—Southwestern Milling Co., Dwight Bldg., will install 400 H. P. equipment.

N. C., Chadbourn.—J. W. Hughes will rebuild water mill reported burned at loss of \$2000.

N. C., Elizabeth City.—Eastern Cotton Oil Co. will install machinery to manufacture soy bean flour.

Tex., Dallas.—Julius H. and Hyman Pearlstone and Tucker Royal, all of Palestine, Tex., purchased feed mill and grain elevator; will remodel, install machinery and increase capacity.

Va., Grayson.—Smith Milling Co., capital \$25,000, inceptd.; R. T. Smith, Pres., Childress, Va.; A. B. Smith, Secy., Snowville, Va.

FOUNDRY AND MACHINE PLANTS

Ala., Birmingham.—Food Drying Machinery. Economy Food Dryer Mfg. Co., capital \$200, inceptd.; J. L. Morrow, Pres.-Treas.; G. B. F. Stovall, V.-P.; G. I. Finch, Secy.

Ky., Louisville.—Gravity Conveyors, etc.—Superior Engine Co., capital \$30,000, inceptd. by Alvin B. Zoeller of Louisville, Walter E. Zoeller of St. Louis, Mo., and John E. Ulrich of Richmond, Ind.

La., New Orleans.—Machine Works.—Crescent City Machine & Mfg. Works, 628 Tchoupitoulas St., will build additional plant; expend \$100,000 for buildings and machinery; purchased site with area of 90,000 sq. ft.; company constructs machinery, operates iron and brass foundry, boiler works, etc.

Md., Cumberland.—Machinery.—McKaig Foundry & Machine Shops plan to build large addition.

Tex., Dallas.—Machine Shop.—Mosher Mfg. Co. increased capital from \$50,000 to \$200,000.

Va., Pulaski.—Foundry and Machine Shops. Pulaski Foundry & Mfg. Corp. completed plans for plant enlargement; extend foundry building and install Bessemer type converter for manufacture of steel castings; erect addition to machine shops; install 20 ft. boring and turning mill, lathes (ordered), gear-cutting machine, heavy lathe 40 in. by 30 ft., combination slotting and key-seating machine, 600-lb. steam hammer for forging purposes, compressed-air system to operate sand rammer, which will also clip, rivet and drill; contemplates enlarging pattern department; let contract for building extensions to J. D. Hubbard. (Lately noted as planning enlargement of foundry and machine shop.)

GAS AND OIL ENTERPRISES

Ky., Bardstown.—Bardstown Oil & Mineral Co., capital \$200,000, inceptd. by R. H. Edelen of Bardstown, A. F. Young, Kansas City, Mo., and J. Ed. Young, Lexington, Ky.

La., Monroe.—Thrift Oil & Gas Co., capital \$100,000, inceptd.; John B. Foster, Pres.; J. H. Trousdale, V.-P.; L. J. Hart, Secy.-Treas.

Okla., Ardmore.—Persheia Oil Co., capital \$100,000, inceptd. by Roy M. Johnson and others.

Okla., Comanche.—Lulu Oil & Gas Co., capital \$30,000, inceptd. by C. S. Wade and others.

Okla., Buffalo.—Buffalo Independent Co., capital \$20,000, inceptd. by M. L. Herring, B. E. Williams and O. S. Carpenter.

Okla., Duncan.—Oil Refinery.—C. S. C. Oil & Refining Co. organized; J. J. Cloughley, Pres. First National Bank of Ringling, Okla., is Pres.; Claude Bell, Gen. Mgr. Apple & Franklin Oil Co. of Ardmore, Okla., V.-P. and Gen. Mgr.; R. W. Adams of Wirt, Okla., Secy.-Treas.; build oil refinery with daily capacity 2000 to 3000 bbls.; controls 420 acres oil leases in Stephens and Cotton counties and 45 acres in Coleman County. (Lately noted inceptd. with \$1,500,000 capital.)

Okla., Duncan.—Wade Oil & Gas Co., capital \$500,000, inceptd. by Cecil H. Smith, Jr. of Duncan, T. A. Edwards of Waurika, Okla., and Henry Price of Addington, Okla.

Okla., El Reno.—Triumphant Oil & Development Co., capital \$150,000, inceptd. by G. M. Langston of Chickasha, Okla.; L. Thompson and J. Rogers of Calumet, Okla.

Okla., Enid.—Ames Oil & Gas Co., capital \$150,000, inceptd. by J. W. Sappington of Oklahoma City, E. C. Ames and S. R. Bowman of Ames, Okla.

Okla., Enid.—Preferred Oil & Gas Co., capital \$150,000, inceptd. by U. G. Canfield, G. M. Monroe and D. Folgesong.

Okla., Lawton.—Mechanics Oil & Development Co., capital \$150,000, inceptd. by D. E. Andrews, Wm. M. Bardshar and H. B. Bryan.

Okla., Healdton.—Hebrew Oil & Gas Co., capital \$65,000, inceptd. by Thos. E. Rowland of Healdton, C. H. Butler and J. T. Hines of Wirt, Okla.

Okla., Oklahoma City.—Money Back Patch Co., capital \$50,000, inceptd. by O. T. Ramos, Frank Wilson and W. L. Perkins.

Okla., Okmulgee.—Oil Refinery.—Bryson Oil & Refining Co., capital \$100,000, inceptd. by Clark F. Bryan and others.

Okla., Pauls Valley.—Pumping Station.—Prairie Oil & Gas Co. plans to build pumping station; cost \$150,000.

Okla., Tulsa.—Oil Storage.—The Oil Storage Co., capital \$25,000, inceptd. by H. H. Porter and others.

Okla., Tulsa.—Ohio-Texas Drilling & Development Co., capital \$10,000, inceptd. by J. H. Arnold, Elta T. Arnold and Mrs. M. F. Ferguson.

Okla., Weatherford.—Burk-Burnette Oil & Gas Co., capital \$100,000, inceptd. by J. H. Anderson and others.

Tenn., Nashville.—Kytanokla Drilling Co., capital \$100,000, inceptd. by C. W. Denning, H. J. Nickabough, J. H. Barber and others.

Wash., V.-P.; Norman W. Kellar, Secy.-Treas.; both of Jacksonville.

Fla., Okeelanta.—W. L. Short of New Orleans, La., J. W. Longbotham of Chester, Pa., C. H. Eustis of Norwalk, Ohio, R. G. Heustis of North Fairfield, Ohio, and A. T. Wright of Chicago purchased 640 acres; will develop for farming and stock raising; expend \$30,000 for immediate improvements; build water tower for household and irrigating purposes, install Delco lighting plant, erect bungalows, etc.

Ga., Elberton.—Hamilton Carhart Cotton Mills retained E. S. Draper, Trust Bldg., Charlotte, N. C., to make typographic survey and complete plans for development of mill village.

Ga., Savannah.—Puritan Dairy Farms, capital \$30,000, inceptd. by Herman Rosenheim and Max Deleh.

N. C., Charlotte.—Earle Whitton retained E. S. Draper, Landscape Archt., Trust Bldg., Charlotte, in connection with proposed development Myers Park.

N. C., Gastonia.—G. Rush Spencer retained E. S. Draper, Trust Bldg., Charlotte, N. C., as landscape architect in connection with residential development; Wilson & Sompayrac, Archts., Columbia, S. C.

N. C., Greensboro.—J. M. Galloway retained E. S. Draper, Trust Bldg., Charlotte, N. C., to act jointly with Harry Barton of Greensboro in planning residential development.

mill-construction building, cost \$2000; no contract; install saw and planing mill machinery, cost \$5000; daily capacity 10,000 to 15,000 ft. pine. (Lately noted inceptd., capital \$20,000.)

La., Baton Rouge.—River View Farms Co. (owned by J. W. Darling Lumber Co. of Cincinnati, Ohio), purchased 500 acres; will erect saw and planing mill.

La., Doyle.—Graves & Patenotte, lately reported as purchasing timber tract and to erect mill, advise that they do not contemplate building mill at Doyle.

La., Hampt.—Williams Bros. will rebuild saw mill reported burned.

La., Oberlin.—Williams Bros. have plans for rebuilding burned sawmill.

N. C., Swain County.—Champion Fibre Co., Canton, N. C., and Hamilton, Ohio, purchased 40,000 acres timber land; wires Manufacturers Record/ Not for immediate development.

Okla., Ardmore.—Hunt's Planing Mill Co., capital \$25,000, inceptd. by Henry T. Hunt and others.

Okla., Garvin.—McCurran Timber Co. organized; M. D. Morphew, Pres.-Mgr.; L. M. Morphew, Secy.; install circular saw mill, daily capacity 2000 ft. rough wagon wood. Lately noted inceptd., capital \$5000. (See Machinery Wanted—Sawmill Machinery.)

S. C., Gilbert.—Smith Bros., capital \$10,000, inceptd. by G. Olin Smith and P. A. Smith.

Tenn., Chattanooga.—Williams & Voris Hardwood Co., capital \$50,000, inceptd. by S. A. Williams, E. D. Woods, M. D. Davis and others.

METAL-WORKING PLANTS

Ga., Waycross.—Door Hangers.—Millan-Fleming Mfg. Co. organized; capital \$15,000; A. Fleming, Pres.; Jas. Millan, V.-P.; S. A. Smith, Secy.; manufacture adjustable sliding-door hangers.

Md., Baltimore.—Brass.—Edro Richardson Brass Co., Edro Richardson, Pres., 318 N. Holliday St., purchased building on Exeter St. near Gay and will probably remodel for brass foundry.

Mo., St. Louis.—Brass.—Eureka Brass Co., Red Bud and Bulwer Aves., will erect 50x150-ft. 1-story mill-construction building. (Contract for addition to foundry lately noted let to Fruin-Colton Contracting Co., St. Louis.)

MINING

Ala., Birmingham.—Sand and Gravel.—Jackson's Lake Sand & Gravel Co., capital \$6000, inceptd.; W. K. Saulsbury, Pres.-Treas.; J. W. Newby, V.-P.; E. K. Farmer, Secy.

Ala., Gadsden.—Mica.—W. J. Beggs & Son contemplate mica development. (See Machinery Wanted—Mica Machinery.)

Ala., Mountain Creek.—Graphite.—Flake-town Graphite Co. organized; E. R. Taber, Mountain Creek, Pres.-Mgr.; W. DeC. Kessler, V.-P., Montgomery, Ala.; W. B. Davidson, Secy.-Treas., Montgomery; develop 200 acres.

Ark., Ponca.—Lead and Zinc.—Kilgore Mining Co. organized; J. Kilgore, Pres.-Mgr.; E. Amibus, V.-P.; H. R. Southerland, Secy.; Thos. Baker, Treas.; develop 160 acres; steam-power machinery; plant cost \$15,000. (Under Harrison, lately noted to build 100-ton concentrating mill.)

Ky., Hopkinsville.—Stone.—Cook Stone Co. organized; J. O. Cook, Pres.; Geo. Rehmer, Mgr.; develop 147 acres; daily output 60 yds. crushed stone; install crushers, etc. Lately noted inceptd., capital \$50,000. (See Machinery Wanted—Drills; Shovel; Locomotive.)

Ky., Paducah.—Clay and Tale.—Old Hickory Clay & Tale Co., capital \$25,000, inceptd. by C. E. Jennings, N. R. Farris, R. N. Scott and S. T. Howard.

La., Pinecliff.—Gravel and Sand.—Liberty Sand & Gravel Co. organized; Jos. Krueber, Pres.; J. D. Burnett, V.-P. and Gen. Mgr.; Ernest Dionne, Secy.-Treas.; develop 100-acre sand and gravel property.

Okla., Hobart.—Gold Crown Mining & Royalty Co., capital \$25,000, inceptd. by C. G. Long, J. M. Rule and J. P. Russell.

Okla., Healdenville.—Bill Jim Mineral Co., capital \$50,000, inceptd. by Jas. Roberts, J. I. Glens and W. J. Ryan.

Okla., Miami.—Leadville Mining & Development Co., capital \$150,000, inceptd. by R. P. Dickey of Kenefick, Okla.; Wm. M. Dunn of Charita, Okla., and R. E. Hatcher of Oda, Okla.

THE OFFICIAL PROPOSAL ADVERTISEMENTS

Appear This Week On Page 92

Notices of bond sales, construction and improvement contracts to be let, equipment and supplies to be purchased, franchises offered, etc., inserted in this department bring bids from the most important bond buyers, investors, financial institutions, contractors, engineers, architects, manufacturers, and supply houses throughout the country.

Rate 25 cents per line per insertion.

The PROPOSAL department goes to press 5 P. M. Tuesday for the issue of the following Thursday. If you cannot mail advertisement in time for any particular issue, please wire copy by day letter.

Send for booklet of testimonial letters from public officials who have used the PROPOSAL department of the Manufacturers Record, for bond sales, construction work, etc.

Tex., Graham.—S. & G. Co., capital \$125,000, inceptd. by E. S. Graham and others.

Tex., Pecos.—Sunshine Oil Corp., capital \$300,000, chartered by Alfred Tinsley, J. B. Howard and B. Y. Biggs.

Tex., Ranger.—Oil Refinery.—Odessa Oil & Refining Co. purchased site for refinery.

Va., Yorktown.—Fuel Oil Station.—Bureau of Yards and Docks, C. W. Parks, Chief Navy Dept., Washington, D. C., will construct reinforced concrete reservoirs each 163 ft. sq. and 22 ft. deep, pump wells and miscellaneous metal work at Fuel Oil Station; bids until April 29. (See Machinery Wanted—Fuel Oil Station.)

W. Va., Huntington.—Eastern Imperial Oil Co., capital \$200,000, inceptd. by Jas. A. Young, J. P. McCloskey, J. H. Sleenberger and others.

ICE AND COLD-STORAGE PLANTS

Ga., Atlanta.—War Dept., Washington, D. C., contemplates building ice factory, refrigerating plant and laundry at Camp Gordon.

S. C., Greenville.—War Dept., Washington, D. C., will build \$54,000 ice and refrigerating plant at Camp Sevier.

S. C., Walthalla.—Hetrick Hosiery Mills will install ice and refrigerating plants; former will have daily capacity 10 tons.

IRRIGATION SYSTEMS

Tex., McAllen.—Rio Grande Conservative Assn. organized; A. J. McCall, Pres.; plans to secure construction reclaiming 3,000,000 acres land on American and Mexican side of Rio Grande; tentative plans involve damming river 150 mi. above mouth by constructing main canal to connect with existing canal systems and thus eliminate necessity for the many large pumping plants.

LAND DEVELOPMENTS

Fla., Hastings.—Du Pont Farms & Livestock Co. organized; authorized capital \$500,000; C. A. du Pont, Pres., Hastings; M. P.

Okla., Enid.—Lopeman Nursery Co., capital \$50,000, inceptd. by J. A. Lopeman, J. A. Lopeman, Jr., and Chas. Harmon.

Va., Fredericksburg.—Virginia-American Farms Corp., capital \$50,000, chartered; Edward E. Samuel, Pres.; Motte Martin, Secy.; both of Detroit, Mich.

Va., Norfolk.—Ocean & Lake Corp., capital \$25,000, chartered; Jos. R. Ives, Pres.; Wm. Old, Jr., Secy.-Treas.

Va., Virginia Beach.—Ocean & Lake Corp., capital \$25,000, inceptd.; Jos. R. Ives, Pres.; J. J. Summerlin, V.-P.; W. W. Old, Secy.-Treas.; develop property south of Virginia Beach; divide into 1800 lots and improve.

W. Va., Charleston.—Sunkist Land Co., capital \$40,000, inceptd. by Jos. H. Gaines, M. H. King, A. A. Lilly and others.

W. Va., Charleston.—Nitro Improvement Co., capital \$60,000, inceptd. by T. J. Robson, T. K. Mowbray, O. H. Hserman and others.

W. Va., Charleston.—Bell Point View Land Co., capital \$50,000, inceptd. by J. S. Billups, B. J. Prichard, S. J. Crum and others.

LUMBER MANUFACTURING

Ala., Montgomery.—John R. Carr of Tuscaloosa, Ala., purchased 5.17 acres in West End; build planing mill and re-milling plant; equipment purchased.

Ala., Mobile.—Edey Lumber Co. increased capital from \$5000 to \$10,000.

Ark., De Queen.—De Queen Lumber Co., capital \$50,000, inceptd. by E. Bertram Pike, W. C. Crenson and J. A. Stallcup.

Ark., Marshall.—Spencer Title & Timber Co., B. F. Spencer, Pres., will install 10 portable sawmills and manufacture lumber on several acres into ties and smaller timbers.

Fla., Palatka.—Surles & Slaughter acquired 9000 acres timber land and will erect sawmill.

Fla., Pensacola.—Pensacola Planing & Saw Mill Co. organized; Joel Frater, Pres.-Mgr.; S. E. Fox, V.-P.; Lewis Nims, Secy.; erect

Okla., Miami.—Aurora Mining Co., capital \$185,000, inctpd. by John E. Turner and others.

Okla., Miami.—Silver Plume Mining & Royalty Co., capital \$500,000, inctpd. by J. D. Young of Fort Worth, Tex.; C. E. Basham of Vernon, Tex., and others.

Okla., Miami.—Bee Mining Co., capital \$200,000, inctpd. by Everett S. Lee of Miami, Edgar D. Smith of Oklahoma City and H. L. Taylor of Okemah, Okla.

Okla., Oklahoma City.—Lead and Zinc.—Reliance Lead & Zinc Co., capital \$350,000, inctpd. by K. Jacobs, E. C. Love and others.

Okla., Oklahoma City.—Bell Metal Mining Co., capital \$150,000, inctpd. by W. C. Krueger, A. H. Decker and others.

Okla., Purcell.—Purcell Mining & Royalty Co. (office not definitely located) organized; B. Evans, Pres.; Lexington, Okla.; D. D. Smith, V.-P. and Field Mgr.; Baxter, Kan.; L. M. Carson, Sec.-Treas.; Lexington; to develop 100 acres. (Lately noted inctpd.)

Okla., Watonga.—Lead King Mining & Development Co., capital \$300,000, inctpd. by G. M. Matlock and J. H. Simms of Watonga and Chas. Loy of Hitchcock, Okla.

Tenn., Chattanooga.—Bauxite.—Georgia Bauxite Co., capital \$40,000, inctpd. by J. R. Barnes, Wm. B. Barnes, E. Watkins and others.

Va., Roanoke.—Iron, Etc.—Pocahontas Coal & Iron Corp., capital \$100,000, chartered; J. H. Dunkley, Pres.; T. W. Fugate, Secy.

MISCELLANEOUS CONSTRUCTION

D. C., Washington.—Heating Mains.—Bureau of Yards and Docks, Navy Dept., let contract Potomac Electric Power Co., 231 14th St., Washington, at \$148,526 to install heating mains in Navy and War offices.

Fla., Jacksonville.—Subway.—L. G. Wallace has permit for \$500 extension of Myrtle Ave. subway.

Fla., West Palm Beach.—Channel, etc.—Lake Worth Inlet Dist. Commrs., E. E. Geer, Secy., will construct inlet cut, approach channel and turning basin (inside work) and outside approach channel and jetties, all as Contract No. 1; also construct creosoted wood wharf, Contract No. 2; Contract No. 1 involves 248,883 cu. yds. earth, 29,830 cu. yds. rock, 5246 cu. yds. jetty hearting and 3268 tons jetty capping; Contract No. 2, 780 front ft. creosoted dock and 1200 front ft. creosoted bulkhead; bids until Apr. 30; Isham Randolph & Co., Chs. Engrs., Barnett Bldg., Jacksonville, Fla. (See Machinery Wanted—Channel Construction, etc.)

Ga., Porterdale.—Natatorium.—Bibb Mfg. Co. let contract to West Point Iron Works, West Point, Ga., to construct natatorium; pool 40x60 ft.; complete tile setting.

Ky., Louisville.—Swimming Pool.—Park Commrs. will expend \$16,000 to construct outdoors swimming pool, dressing-rooms, etc.; circular, 180 ft. diam.; Joseph & Joseph, Louisville, preparing plans. (Lately noted.)

Md., Baltimore.—Dredging.—City let contract Maryland Dredging & Contracting Co., 1515 Fidelity Bldg., Baltimore, to dredge harbor this year; cost not to exceed \$40,000 appropriation.

Miss., Clarksdale.—Levee.—Levee Board, T. F. Dubney, Ch. Engr., will construct additional levees; 2,650,000 cu. yds.; bids until Apr. 30. (See Machinery Wanted—Levee Construction.)

Tex., Austin.—Wall.—Bruce W. Bryant, Supt. Public Buildings and Grounds, has let contract to construct concrete wall costing \$500 in San Jacinto Bayou to protect San Jacinto Park.

MISCELLANEOUS ENTERPRISES

Ga., Atlanta.—Laundry.—War Dept., Washington, D. C., contemplates building laundry, ice factory and refrigerating plant at Camp Gordon.

Ga., Cuthbert.—Grain Elevator.—D. B. Teabent and others will establish grain elevator, flour mill and knitting mill; cost \$125,000.

Ga., Porterdale.—Laundry.—Bibb Mfg. Co. let contract to West Point Iron Works, West Point, Ga., to build laundry.

Ga., Savannah.—Laundry.—Star Laundry Co., capital \$25,000, inctpd. by Geo. R. Benton, Jos. P. Temple and others.

La., De Ridder.—Creosoting.—Shreveport Creosoting Co. of Shreveport, La., main office, 401 Main St., Louisville, Ky., Robt. H. Moore, Constr. Engr., will build additional plant; construction by the company; purchased machinery, etc. (Under La., Shreveport, lately noted to enlarge plant.)

Md., Baltimore.—Navigation.—Maryland Navigation Co., capital \$500,000, inctpd.; Warren A. Blake (of W. A. Blake & Co.), 7 S. Gay St., Pres.; Geo. A. Rossing, Treas.; G. J. Hermansdorfer, Secy.; proposes to build and operate fleet of vessels to operate along coast, West Indies, etc.

N. C., Selma.—Publishing.—Johnstonian Publishing Co., capital \$25,000, inctpd. by N. E. Edgerton and R. H. Burris.

Okla., Enid.—Engineering.—Prosperity Engineering Co., capital \$25,000, inctpd. by C. E. Richmond and W. H. Hall of Enid, and B. M. Weiss of Henryetta, Okla.

Okla., Heavener.—Hardware, Etc.—Walker-Johnson Hardware & Furniture Co., capital \$7000, inctpd. by R. L. Walker, Lewis S. Johnston and W. H. Washburn.

S. C., Charleston.—Packet Delivery.—Packet Delivery Co., capital \$1000, inctpd. by B. A. Hagood and Arthur R. Young.

S. C., Greer.—Plumbing Materials, etc.—Brockman Bros. Co., capital \$5000, inctpd. by J. O. Brockman and R. H. Bearden.

S. C., Lake View.—Hardware.—Peoples Hardware Co., capital \$15,000, inctpd. by W. H. Gaddy, H. H. Bailey and W. B. Ford.

Tenn., Chattanooga.—Hardware.—Williams & Voris Hardware Co., capital \$50,000, inctpd. by S. A. Williams, Lyle Motlow, E. De L. Wood and Sam L. Boddy.

Tenn., Nashville.—Water Bottling.—Pioneer Water Co., capital \$150,000, inctpd. by R. M. Dudley, J. T. Reese, Chas. Q. Stephens and others.

Tex., Dallas.—Grain Elevator.—Liberty Grain Co., capital \$10,000, inctpd. by Tony Brignardello, G. M. Shannon and F. P. Garvin.

Tex., Dallas.—Grain Elevator, etc.—Julius H. and Hyman Pearlstone and Tucker Royal, all of Palestine, Tex., purchased grain elevator and feed mill; will remodel, install machinery and increase capacity.

Va., Boone Mill.—Mill supplies.—Boone Mill Supply Co., capital \$15,000, inctpd.; C. J. Winsey, Pres.; E. L. Blankenship, Secy.-Treas.

Va., Richmond.—Powder Packing.—War Dept., Washington, D. C., will build plant (rumored to cost \$3,000,000) for powder packing; 1740-acre site in Henrico County, 6 mi. east of Richmond; E. I. du Pont de Nemours & Co., Wilmington, Del., to operate plant for Government; employ 3,000.

W. Va., Martinsburg.—Electrical Equipment.—Berkeley Battery Co., capital \$3000, inctpd. by Everett H. Truman, W. H. S. Nelson, W. C. Kilmer and others.

W. Va., Marlinton.—Construction.—Duncan Construction Co., capital \$10,000, inctpd. by Geo. W. Duncan, Harper Adkisson, John Waugh and others.

MISCELLANEOUS FACTORIES

Ark., Pine Bluff.—Vending Machines.—Traction Vending Machine Co., capital \$100,000, inctpd. by J. H. Mann, Jr., A. Z. Orto, J. P. Wright and others.

Fla., Pensacola.—Ice-Cream.—D'Alemberte's Pharmacy will install ice-cream plant; equipment to include 5-ton uniflow refrigerating machine with motor belt, etc.; 40-qt. direct-expansion ice-cream freezer with individual electric motor; insulation and cold-storage doors and direct-expansion ammonia coils for hardening and milk rooms; has let contracts.

Ky., Louisville.—Saddlery.—Belknap Hardware & Mfg. Co. increased capital from \$4,000,000 to \$5,000,000.

Ky., Madisonville.—Cigars.—American Cigar Co. (main office, 111 Fifth Ave., New York) will establish cigar factory; leased building and will remodel.

La., Lake Charles.—Naval Stores.—Lake Charles Naval Stores Co., capital \$900,000, organized; W. B. Gillican, Pres.; A. Vizard and B. Chipley, V.-P.s; all of New Orleans; W. A. Hood, V.-P. and Gen. Mgr.; A. Vizard, Jr., Secy.-Treas.; has leases on 60,000 acres turpentine land in Southwestern Louisiana and will continue developments.

La., Lake Charles.—Chemicals.—Lambert Chemical Co., St. Louis, has final plans and specifications for factory; construct 120x50-ft. corrugated iron building on concrete foundation; 2 other structures 2 or 3 stories high and 200x200 ft. each; install machinery to manufacture nitrate of soda, sulphur products and other chemicals. (Lately noted to build plant.)

La., New Orleans.—Rice Mill.—Haspel & Davis Milling & Planting Co., 2215-2221 N. Peters St., will rebuild rice mill reported burned at loss of \$42,000.

La., Vinton.—Rice.—Carter and Thompson of Lake Charles, La. (represented by D. O. Vincent, of Vinton), will build rice mill. (See Cotton Compresses and Gins.)

Mo., St. Louis.—Leather.—Liberty Leather Co., capital \$7500, inctpd. by Sam S. Craslinneck, J. A. Pastelnick and Salem Weiss.

Mo., St. Louis.—Shoes.—Brown Shoe Co., 1516 N. Jefferson St., will build factory addition costing \$6500.

N. C., High Point.—Paper Boxes.—Reidsville Paper Box Co., Reidsville, N. C., purchased factory building and will remodel and equip to manufacture paper boxes.

S. C., Charleston.—Traffic Signals.—American Traffic Signal Co., capital \$10,000, inctpd. by Jos. A. Black, John F. Riley and Louis M. Shinnal.

S. C., Greenville.—Belting.—Greenville Belting Co., capital \$10,000, inctpd. by M. C. Sanders and C. Graham Slaughter.

S. C., Spartanburg.—Candy.—Price Candy Co. plans increasing capital from \$10,000 to \$50,000.

Tenn., Chattanooga.—Tar Roofing Products.—F. J. Lewis Mfg. Co. of Chicago secured 5-acre site on which to build redistillation plant for reduction of by-product tar to roofing pitch; first unit to be 64x250 ft.; construction engineer making preliminary investigations.

Tenn., Maryville.—Nitrate.—Aluminum Co. of America, Pittsburgh, Pa., will build \$2,000,000 plant to manufacture nitrate as a by-product of its present aluminum works and hydro-electric development; plant to cover 7 acres; brick, cement and steel buildings; fireproof construction; electric power to be transmitted from Alcon (Tenn.) dam, now being constructed, at cost of \$300,000, on Little Tennessee River 50 mi. from Knoxville.

Tenn., Memphis.—Medicine.—McHale Mfg. Co., capital \$15,000, inctpd. by T. J. McHale, H. D. Hughey, R. F. Malone and others.

Tenn., Memphis.—Bedding.—United States Bedding Co. will erect factory; 1 story; brick; cost \$30,000.

Tex., Dallas.—Bakery.—Carraud Parisienne Bakery & Catering Co., capital \$10,000, inctpd. by Frank Carraud, Locote Ollivier, J. C. Mattox and Currie McCutcheon.

Tex., Galveston.—Overall.—Cyrus W. Scott Mfg. Co., David E. Ozuts, Secy.-Treas., Houston, leased 2 upper floors at 2308-2311 Market St., and will install overall plant.

Tex., San Antonio.—Novelties.—Buckhorn Novelty Co., capital \$4000, inctpd. by J. T. Harris and others.

Va., South Hill.—Tobacco.—Roberts Tobacco Co., Chase City, Va., let contract to Cleveland Browning, South Hill, to erect 200x100-ft. semi-fireproof building, cost within \$20,000; install tobacco dryer (purchased), cost \$18,000; daily capacity 25,000 lbs. leaf tobacco.

Va., Alexandria.—Fruit Products.—National Fruit Product Co. increased capital from \$200,000 to \$500,000.

Va., Lynchburg.—Dawson Bros. Mfg. Co. increased capital from \$100,000 to \$300,000.

Va., Newport News.—Food Products.—Virginia Food Products Corp., capital \$500,000, chartered; A. L. Powell, Pres.; Jos. I. Lane, V.-P. and Mgr.; M. E. Jones, Secy.

Va., Norfolk.—Tobacco.—Old Dominion Tobacco Co. increased capital from \$150,000 to \$400,000.

MOTOR CARS, GARAGES, TIRES, ETC.

Ark., Little Rock.—Automobiles, etc.—Capital Motor Co., 314 Louisiana St., organized; J. N. Wheeler, Pres.; John M. Quarles, V.-P. and Mgr.; R. J. Brooks, Secy.; deal in automobiles, trucks, tractors and threshers. (Lately noted inctpd., capital \$25,000.)

Ga., Atlanta.—Garage.—C. S. Sisson and others let contract to Gude & Co., Candler Bldg., Atlanta, to erect 100x200-ft. ordinary-construction garage, cost \$25,000; plans by A. Ten Eyck Brown, Atlanta. (Lately noted.)

Ga., Gainesville.—Garage.—R. D. Mitchell will rebuild garage reported burned.

Ga., Savannah.—Automobiles.—Chatham Motor Co., contemplates erecting building to cost \$50,000.

Ga., Valdosta.—Automobile Repairing, etc.—A. A. Parrish Co., capital \$10,000, inctpd. by C. E. Parrish, R. E. Parrish and Mrs. M. E. Parrish.

La., Alexandria.—Automobile Repairs, etc.—Alexandria Battery & Rubber Co., capital \$10,000, inctpd.; Leory B. Williams, Pres.; Eugene G. Blondeau, V.-P.; John H. Blijdenstein, Secy.-Treas.

La., Shreveport.—Automobile Manufacturing.—Louisiana Motor Car Co. will build automobile plant in Cedar Grove.

Md., Baltimore.—Garage.—Weitzer Bros., 2213 McElderry St., will erect garage at 528 Madeira St.; brick; 40x15 ft.; 1 story; plans by Fred E. Beall, 306 St. Paul St., Baltimore.

Mo., Kansas City.—Garage.—Gridley Motor Co. will rebuild garage reported burned.

N. C., High Point.—Garage.—Wilson Motor Co. will rebuild garage reported burned at loss of \$10,000.

Okla., Oklahoma City.—Automobile Supplies.—Rex Auto Supply Co., capital \$250,000, inctpd. by B. F. Williams, J. A. Burt, Jr., and S. D. Rogers.

Okla., Poteau.—Automobiles and Trucks.—Climber Motor Corp. organized; W. F. Drake, Pres.; C. E. F. Harria, V.-P. and Mgr.; S. J. Doyle, Secy.; erect 4 buildings; 100x300 and 100x270 ft.; open building proposals Oct. 15; lately noted inctpd., capital \$100,000. (See Machinery Wanted—Steel; Concrete.)

Okla., Tulsa.—Automobile Repairs.—Auto Repair & Ignition Co., capital \$8000, inctpd. by Leo A. Newsome and others.

S. C., Sumter.—Automobiles.—Chandler-Harmon Motor Co., capital \$1000, inctpd. by W. T. Harmon, of Sumter, and G. C. Chandler of Florence, S. C.

Tenn., Columbia.—Garage.—Fry Bros. will lease garage which S. O. Thomas will build; 122x98-ft. structure; pressed brick with plate-glass front; contain 96x80-ft. repair shop with concrete floor; steam heat; C. K. Colley, Archt., Nashville, Tenn.

Tex., Beaumont.—Automobiles.—Flores Led better Auto Co., capital \$8,300, inctpd. by M. A. Ledbetter, S. J. Flores and S. H. Vance.

Tex., El Paso.—Automobile Repair Shop.—City let contract J. E. Morgan of El Paso to erect automobile repair shop; brick; cost \$2926.

Tex., Sterling City.—Garage.—Ben Rawls will erect garage; brick and concrete; cost \$6000.

Tex., Texarkana.—Automobiles.—Creekmore Motor Co., capital \$20,000, inctpd. by J. J. Creekmore and others.

Tex., Waco.—Automobiles.—Overland Sales Co., capital \$21,000, inctpd. by Walter Roach, C. D. Adams and E. F. Zarr.

Va., Boone Mill.—Blue Ridge Mining Co., capital \$50,000, inctpd.; M. T. Slink, Pres.; J. M. Kendrick, Secy.

Va., Lynchburg.—Automobiles.—Leftwich Motor Co., capital \$100,000, organized; R. G. Leftwich, Pres.; R. B. Tankerley, Secy.

W. Va., Weston.—Garage.—Albert Breterault of Clarksburg, W. Va., has contract to erect garage; Fred Graves will superintend construction.

W. Va., Wheeling.—Automobiles.—F. M. Sheetz Motor Co., capital \$25,000, inctpd. by E. C. Prince and E. C. Sheetz of Wheeling, F. M. Sheetz of Greggsville, W. Va., and others.

RAILWAY SHOPS, TERMINALS, ROUNDHOUSES, ETC.

Va., Bristol.—Norfolk & Western Ry., J. E. Crawford, Ch. Engr., Roanoke, Va., will expend \$1,000,000 for enlargement and improvement of yards, more than doubling present facilities; proposes to build shops, 16-stall roundhouse, bridges, crossings and tracks; roundhouse plans to provide for future enlargement to capacity for 24 engines.

ROAD AND STREET WORK

Ala., Florence.—Lauderdale County Commissioners are reported to have appropriated \$50,000 to construct roadway approaches to Government Dam No. 2 at Muscle Shoals.

Ala., Mobile.—Mobile County Board of Revenue has cost estimate and will order vote on bonds for road construction.

Ala., Tusculum.—Colbert County Commrs. appropriated \$50,000 to construct roadway approaches to Government Dam No. 2 at Muscle Shoals; construction under direction of Hugh L. Cooper.

Ark., Harrison.—Boone County Road Improvement Dist. No. 1, F. M. Garvin, Secy. of Board, will construct 37 mi. macadam roads; 15 and 25 acres, respectively, of clearing and grubbing; 185,500 cu. yds. earth excavation; 2000 cu. yds. rock excavation; 150 stations machine grading; 3258 lin. ft. pipe culverts; 1012 cu. yds. reinforced concrete culverts; 53,300 lbs. reinforced steel in culverts; 565 lin. ft. bridges (bids on timber, concrete and steel); 46,624 cu. yds. field

stone; 18,176 cu. yds. crushed limestone (local material); bids opened Apr. 18; Pritchett & Hight, Civ. and Const. Engrs., Walnut Ridge, Ark.

Ark., Mountain Home.—Baxter County has \$20,000 appropriation from State Highway Comsn., Little Rock, for construction of its portion of Cotter-Henderson Highway; 25 mi.; surveys made.

D. C. Washington.—Dist. Comms. let contract G. B. Mullen of Washington, at \$6800 to grade 13th St. N. E., from Franklin to Girard St., 38th St. and Woodley Road.

Fla., Bradentown.—Manatee County Comms., Wm. M. Taylor, Clerk, let contract to R. A. Miller, Palmetto, Fla., to construct hard-surfaced roads and bridges, Palmetto Special Road & Bridge Dist.; \$190,000 available; Engr., Chas. S. Hill, Palmetto. (Bids lately noted on 35 mi. road.)

Fla., Milligan.—Okaloosa County Comms. let contract to F. M. Dobson of Milligan to construct hard road between Crestview and Baker.

Fla., Pensacola.—Escambia County will construct concrete road from county bridge at Bayou Chico to U. S. Government bridge across Bayou Grande; County Comms., J. Geo. White, Chmn., receive bids until May 14. (See Machinery Wanted—Road Construction.)

Ga., Carrollton.—City is having surveys and specifications prepared by Knox T. Thomas, 502 Forsyth Bldg., Atlanta, Ga., for 20,000 sq. yds. paving; material not decided; call for bids within 30 days; \$50,000 available. (Lately noted.)

Ky., Henderson.—Henderson County Comms. will improve roads; plan to build 10 mi. this year.

Ky., Madisonville.—Hopkins County Comms. will expend \$16,000 to improve Princeton-Greenville and Madisonville-Princeton Roads; \$8000 of this amount to be contributed by State; J. M. Flannagan, County Engr.

Ky., Paducah.—McCracken County Comms. let contract L. R. Figg of Paducah to rebuild Benton Road from city limits to county line, 7 mi.

Md., Laurel.—War Dept., Washington, D. C., will construct road from Camp Harrington at Laurel to Camp Meade, near Annapolis Junction; State Roads Comsn., Garrett Bldg., Baltimore, will prepare plans and have charge of engineering and supervising.

Md., Rockville.—Montgomery County will construct 1 1/2 mi. State-aid highway upon old along street connecting Norbeck State Rd. with Frederick and Darnestown Rds. at town limits of Rockville; 21,000 sq. yds. concrete; County Comms., Berry E. Clark, Clerk, receives bids until May 7. (See Machinery Wanted—Road Construction.)

Miss., Columbus.—City contemplates paving streets in business section. Address The Mayor.

Miss., Kosciusko.—Attala County Highway Comms., C. C. Fancher, Chmn., Road District No. 1 of Supervisors District No. 2, will construct 20 mi. sand-clay road; bids until May 6 (readvertisement, with change of date); also bids to furnish culvert pipe; M. D. Smith, Engr., Kosciusko. (See Machinery Wanted—Road Construction.)

Miss., Meridian.—Lauderdale County voted \$20,000 bonds to surface Burlington Highway; Government to appropriate \$20,000 additional. Address County Comms. (Lately noted to vote.)

Mo., Booneville.—Cooper County, Booneville Township, voted \$100,000 bonds to construct rock roads; postpone construction until after war. R. D. Pealer, County Clerk.

Mo., Nevada.—Vernon County, Center Township, will improve state road, Project No. 17.3; 6 1/2 mi. grading and surfacing with Joplin Chats, 16 ft. wide; includes culverts and incidental work; bids until May 7; W. H. Wood, Engr., Courthouse, Nevada. (See Machinery Wanted—Road Construction.)

Mo., Savannah.—Andrew County defeated \$1,000,000 bonds to construct hard roads. (Noted in March.)

Mo., St. Louis.—City let following contracts for alley paving totaling \$50,439.40, John F. McMahon Construction Co. at \$22,240.75; Eyerhmann Construction Co. at \$14,673.75; Skraluka Construction Co. at \$5,728.90; Frank A. Stiers at \$5,596.45; Perkinson Bros. Construction Co. at \$2,199.55, all of St. Louis.

Mo., Van Buren.—Carter County voted \$75,000 bonds to construct roads; A. D. McSpadden, official in charge; W. A. Partney, Engr.

N. C., Goldsboro.—City, Edw. A. Beck, City Mgr., will issue \$40,000 bonds for paving.

Tenn., Manchester.—Dept. of Highways, State of Tennessee, J. J. Murray, Secy., Nashville, will construct 5.65 mi. State Highway No. 7, between Franklin-Coffee county line, near Tullahoma, and Coffee-Moore county line, in Coffee County; principal items include: Common excavation, 13,920 cu. yds.; grader work, 1 mi.; water-bound macadam, 8 in. thick, 10 in. in width, 33,848 sq. yds.; overhaul on macadam, 20,565 cu. yds.; furnishing, hauling, laying and back-filling 15-in. corrugated metal pipe or concrete tile, 120 lin. ft.; 30-in. corrugated metal pipe or concrete tile, 280 lin. ft.; Class A concrete, 40 cu. yds.; Class B concrete, 35 cu. yds.; reinforcing steel, furnishing, hauling, bent and in place, 3550 lbs.; bids until May 13; A. M. Nelson, State Highway Engr., Nashville. (See Machinery Wanted—Road Construction.)

Tex., Fort Worth.—Board of Comms. will pave 5 blocks Travis Ave. from Shaw to Cante St.; cost \$16,493.62.

Tex., Highland Park, P. O. at Dallas.—City let contracts Standard Engineering & Construction Co. and Flippen-Prather Realty Co., both of Dallas, to pave Armstrong Ave. and Knox St.; former will be paved with Uvalde rock with asphalt binder at cost of about \$3500.

Tex., Houston.—Harris County will construct 2 1/2 mi. surface treatment on Goose Creek Road and build concrete bridge at Atascocita crossing on San Jacinto River; bids opened Apr. 24; H. L. Washburn, County Auditor. (See Machinery Wanted—Road and Bridge Construction.)

Tex., McKinney.—Collins County voted \$69,000 bonds to construct roads. Address County Comms. (Lately noted to vote.)

Va., Fairfax.—Virginia State Highway Comsn. asks bids at County Clerk's office, Fairfax, until May 6 to construct from 3 to 5 mi. State roads, from Fairfax toward Chantilly; G. P. Coleman, State Highway Commr., Richmond, Va. (See Machinery Wanted—Road Construction.)

Va., Charlottesville.—Virginia State Highway Comsn. asks bids at office of F. A. Davis, U. S. Highway Engr., Court House, Charlottesville, Va., until May 7, to construct 3.16 mi. State Highway System, Route 9, between Mechum River and Ivy; G. P. Coleman, State Highway Comms., Richmond, Va. (See Machinery Wanted—Road Construction.)

Va., Winchester.—Valley Turnpike Co., Harrisonburg, Va., will resurface sections of road between Winchester and Staunton; purchased material.

W. Va., Huntington.—Cabell County Court, R. S. Douthat, Clerk, later noted to receive bids until Apr. 16 on 2 1/2 mi. road construction, has not yet let contract; no bids tendered; paving brick; on concrete base.

W. Va., Wayne.—Wayne County will open bids about July 1 or Aug. 1 for road construction; brick on concrete base; \$1,000,000 available; A. D. Williams, Engr., Charleston, W. Va. (Lately noted voting \$1,000,000 bonds to construct 30-mi. road connecting Cabell and Mingo County lines.)

SEWER CONSTRUCTION

Ark., Nashville.—City contemplates improving sewer and water systems; cost \$114,500. Address The Mayor.

N. C., Goldsboro.—City, Edw. A. Beck, City Mgr., will issue \$15,000 bonds to extend sewers.

S. C., Andrews.—City is having plans prepared for sewer system and water works. Address The Mayor.

Tex., Fort Worth.—War Dept., Capt. Dwight Horton, Constr. Quartermaster, will expend about \$30,000 to construct sewer system at Camp Bowie; J. S. Abbott, War Dept. Engr., completed preliminary survey and will submit recommendations. (Lately noted to construct sewer system.)

Tex., Stamford.—City votes May 11 on \$35,000 bonds to construct sewer system. Address City Engr.

Tex., Stamford.—City, R. L. Penick, Mayor, votes May 11 on \$35,000 bonds for sewers. (See Water-works.)

Va., Newport News.—City will construct sewers in Marshall Ave. from 29th to 32d St. and in 30th, 31st and 32d Sts. from Marshall to Madison Ave.; bids until Apr. 30; T. E. Pearce, City Engr. (See Machinery Wanted—Sewer Construction.)

Va., Richmond.—City will construct additional sewers; bids until Apr. 26; Chas. E. Bolling, City Engr. (See Machinery Wanted—Sewer Construction.)

W. Va., Martinsburg.—City will construct 1520 lin. ft. 24-in. sewer in East Brooke St.

and Maple Ave.; also catch basins, manholes, etc.; bids until May 18; T. W. Sparrow, Commr. of Streets. (See Machinery Wanted—Sewer Construction.)

SHIPBUILDING PLANTS

Fla., Fernandina.—Ocean Tugs and Barges, R. C. Camp, Jno. A. Ryan, Jas. T. Farrington, Wm. A. Wallace and A. W. Knowles will establish shipyard; construct 10 ways; invest \$1,000,000; equip to construct ocean tugs; have \$5,000,000 contract to build 12 ocean tugs and 12 barges for French Government.

Fla., Jacksonville.—Steel Ships.—Merrell-Stevens Co. will reconstruct bldg. containing fabrication shop and mould loft of shipbuilding plant burned at loss of \$105,000.

Fla., Tampa.—Steel and Wood Ships.—Tampa Dock Co. will construct marine ways for vessels up to 5000 tons; install considerable machinery; awarded equipment contracts; preparing dock plans and specifications; expenditure, \$250,000; builds steel and wood ships.

Ga., Brunswick.—Wooden Barges.—The Foundation Co., Woolworth Bldg., New York, has merged Carpenter-Watkins Co. and will operate here as The Foundation Co., Carpenter & Watkins, Inc.; enlarge plant, which has 6 ways; construct wooden barges; has Government contract for 200 wooden barges, each 110 ft. long.

Ga., Savannah.—Concrete Ships.—Concrete Shipbuilding Co., capital \$50,000, inceptd. by Ivar Widing of Savannah, H. S. Wells, W. P. Gilby and Jesse Dimmick of New York; establish plant to construct concrete ships. (Ivar Widing lately noted investigating with view of establishing concrete shipyard.)

Ky., Louisville.—River Craft.—The Foundation Co., Woolworth Bldg., New York, merged Reid Shipbuilding Co., Chicago; contemplates establishing shipyard for building river craft.

N. C., Wilmington.—Steel Ships.—Carolina Shipbuilding Co., subsidiary of George A. Fuller Co., Fuller Bldg., New York, will establish plant to build steel ships; build 6 marine ways; construct 9000-ton steel ships of Isherwood type; has Government contract for 18 of these vessels; Ralph Starrett, Gen. Mgr., in charge at Wilmington.

TEXTILE MILLS

Ga., Acworth.—Hosiery.—Acworth Hosiery Mills organized with \$20,000 capital; R. L. McMillan; L. M. Awtry, Secy.; J. E. Carnes, Treas.; all of Acworth; W. F. Hetrick, V.-P., Gainesville, Ga.; erect 80x40-ft. brick-construction building costing \$2300; install 30 to 40 knitting machines with electric power drive, cost \$16,000; daily output 200 doz. pairs hose. (W. F. Hetrick lately noted to organize company.)

Ga., Cuthbert.—Knit Goods.—D. B. Teabaut and others will establish knitting mill, flour mill and grain elevator; cost \$125,000.

N. C., Mt. Airy.—Hosiery.—Jno. Banner is reported as to establish hosiery-knitting mill.

N. C., Norwood.—Cotton Products.—Norwood Mfg. Co. increased capital from \$200,000 to \$500,000.

N. C., Staley.—Hosiery.—Staley Hosiery Mills chartered by C. P. Fox, A. L. McArthur and P. A. Staley; capital \$50,000.

S. C., Rock Hill.—Hosiery.—Liberty Hosiery Co. will be organized by J. C. Cauthen; capital \$25,000; leased building; install 50 knitting machines with electric power drive; purchased equipment; daily capacity 300 doz. pairs hose.

Tex., McKinney.—Cotton Goods.—Texas Cotton Mill Co. increased capital from \$220,000 to \$440,000.

Va., Petersburg.—Cotton Cloth.—Pocahontas Cotton Mills organized; F. L. Robbins, Pres.; Leon Lowenstein, V.-P.; Josiah Canter, Secy.-Treas.; leased mill from Virginia Consolidated Milling Co.; has 7200 spindles and 186 looms. (Lately noted chartered with \$200,000 capital.)

WATER-WORKS

Ark., Luxora.—City issued \$10,000 bonds for water-works. Address The Mayor.

Ark., Nashville.—City contemplates improving water and sewer systems; cost \$114,500. Address The Mayor.

Fla., Greenville.—City votes May 7 on bonds to construct water-works. J. Vickers, City Clerk.

Ky., Versailles.—City, H. C. Taylor, Mayor, will install new water plant. (Lately noted issuing \$20,000 bonds.)

N. C., Goldsboro.—City, Edw. A. Beck, City Mgr., will issue \$35,000 bonds to extend water system.

N. C., Saluda.—City plans to issue \$3000 bonds to increase water supply and extend system; John Pace, Mayor.

S. C., Andrews.—City is having plans prepared for water-works and sewer system. Address The Mayor.

Tex., Corpus Christi.—City voted \$75,000 notes to enlarge water plant; improvements to include construction of earthen settling basins, capacity 10,000,000 gals.; additional filtration plants, pumps and engine; purchase 7 1/2 acres for basins; city water supply is Nueces River, at Calallen, 16 mi. distant. Address Mayor Miller. (Lately noted to vote.)

Tex., Corsicana.—City voted \$40,000 bonds to construct reservoir for water supply. Address The Mayor. (Lately noted to vote.)

Tex., Mineral Wells.—City will construct water system; include storage reservoir in Rock Creek Valley consisting of dam containing 104,000 cu. yds. earth work, material to be secured from excavation for spill-way and borrow pits; 10,000 sq. yds. slope protection work; 500 cu. yds. concrete; excavation of rock hillside; 200 acres clearing and grubbing; natural rock spill-way, etc.; bids until May 6; Wm. W. McClendon, City Engr. (See Machinery Wanted—Water-works.)

Tex., Stamford.—City votes May 11 on \$440,000 bonds to provide water supply; plans to construct reservoir and dam at Clear Fork of Brazos River. Address City Engr. (Lately noted to vote.)

Tex., Stamford.—City, R. L. Penick, Mayor, advises Manufacturers Record: Will vote May 11 on \$440,000 bonds for water supply and \$35,000 bonds for sewers; contemplate construction of dam across Clear Fork of Brazos River, and 16-mi. pipe line. (Lately noted.)

W. Va., Charleston.—West Virginia Water & Electric Co., 131 Summer St., contemplates construction addition to filter plant; J. L. Montgomery, Engr., Coyle-Richardson Bldg., Charleston.

WOODWORKING PLANTS

Ala., Talladega.—Cooperage.—Talladega Cooperage & Lumber Co. organized; W. A. Savage, Pres.-Mgr.; J. E. Winning, V.-P.; W. M. George, Secy.; erect plant to cost \$25,000; purchased machinery, cost \$18,000; cooperage. (Lately noted inceptd., capital \$25,000.)

Ark., Blytheville.—Cooperage.—Blytheville Cooperage Co. increased capital from \$50,000 to \$90,000.

Ark., Prescott.—Staves.—Arkadelphia Milling Co., Arkadelphia, Ark., will establish stave finishing plant.

Fla., Tarpon Springs.—Cooperage.—Tarpon Lumber & Supply Co., O'Cramer and Jackson Sts., will install machinery to manufacture barrels and kegs; equipment purchased.

Ga., Statesboro.—Wooden Novelties.—Statesboro Novelty Works (T. L. and J. A. Davis) will rebuild plant reported burned at loss of \$3000 on buildings and machinery.

Ky., Louisville.—Carriages.—Louisville Carriage & Taxicab Co. increased capital from \$200,000 to \$300,000.

La., New Orleans.—Cigar Boxes.—Phoenix Cigar Box Mfg. Co. will rebuild factory at 213 Tchoupitoulas St. reported burned.

S. C., Cutawville.—Boxes.—Santee Mfg. Co. will install box machinery, engine and boiler. (See Machinery Wanted—Box Machinery.)

Tex., Dallas.—Cooperage.—Dallas Cooperage Co. will rebuild plant reported burned at loss of \$5000.

Va., Opequon.—Staves and Heading.—Chas. W. Sneff contemplates installing machinery to manufacture sawed barrel staves and heading. (See Machinery Wanted—Stave and Heading Machinery.)

FIRE DAMAGE

Ala., Gadsden.—W. C. Paden's dwelling.

Ala., Thorsby.—Dormitory of Thorsby Institute; loss \$9000.

Ala., Gadsden.—J. E. Blackwood's residence; loss \$3000.

Ark., Lacrosse.—W. H. Gaston's residence, near Lacrosse; loss \$2000.

Ark., Little Rock.—Mrs. H. P. Edmonson's dwellings; loss \$10,000.

Fla., Tarpon Springs.—Webster Little's 2 cottages; loss \$4000.

Ga., Columbus.—Chas. E. Dudley's barn near Seale; loss \$6000.

Ga., Gainesville.—R. D. Mitchell's garage.
La., Hampt.—Williams Bros.' sawmill.

Ga., Statesboro.—Statesboro Novelty Works, operated by T. L. and J. A. Davis; loss on buildings and machinery, \$3000.

Ky., Lexington.—John Traynor's 2 dwellings.

La., Ashland.—Ashland High School; loss \$10,000. Address School Trustees.

La., New Orleans.—Phoenix Cigar Box Mfg. Co.'s plant at 213 Tchoupitoulas St.

La., New Orleans.—Haspel & Davis Milling & Planting Co.'s rice mill at 2215-2221 N. Peters St.; loss \$42,000.

Md., Baltimore.—Camel-house at zoo in Druid Hill Park. Address Park Commrs., Druid Hill Park.

Md., Dodson.—Three double dwellings of Garrett County Coal & Mining Co.; loss \$9000.

Md., Granite.—Dr. Harry F. Shipley's residence.

Mo., Clever.—Evans Drug Store; Edick Hotel; loss about \$18,000.

Mo., Kansas City.—Gridley Motor Co.'s garage.

Md., Mt. Pleasant.—(R. D. from Frederick).—Barn, dairy house and wagon shed on farm of Chas. W. Reese, near Mt. Pleasant; loss \$10,000.

N. C., Chadburn.—J. W. Hughes' water mill; loss \$2000.

N. C., Concord.—Mt. Zion Church; loss \$10,000. Address The Pastor.

N. C., High Point.—Wilson Motor Co.'s garage; loss \$10,000.

N. C., Badin.—Southern Aluminum Co.'s apartment house.

S. C., Greenville.—Armstrong Pharmacy, loss \$15,000; J. C. Armstrong, Mgr.; F. M. Wharton & Co.'s store, loss \$25,000; De Madder & Son's art studio, loss \$10,000.

Tenn., Bristol.—Savoy Restaurant, pool room and fruit stand owned by Claude Brady, Roanoke, Va.

Tenn., Columbia.—Mann Dawson's country residence; loss \$10,000.

Tenn., Memphis.—Dwellings of S. J. Arnett, A. B. Clark and C. B. Waldrup; loss \$8000.

Tex., Dallas.—Dallas Cooperage Co.'s plant; loss \$5000.

Tex., El Paso.—Dwellings of Mrs. Paul Derr and J. W. Earle; loss \$10,000.

Va., Richmond.—T. W. Wood & Sons warehouse, Nos. 11, 12, 13, 15, 17.

Va., Timberville.—Samuel Pence's barn, wagon shed, chicken-house and corn crib; loss \$5000 to \$6000.

Va., Waverly.—P. Fleetwood & Co.'s store; loss about \$10,000.

DAMAGED BY STORM

Ark., DeVall Bluff.—Barn, silo, chicken house, etc.; on Judge Lankford's farm near DeVall Bluff.

Ark., Keo.—Methodist Church. Address The Pastor.

BUILDING NEWS

BUILDINGS PROPOSED

APARTMENT-HOUSES

Fla., Miami.—Fredk. H. Rand, Jr. will erect duplicate of Valencia Apartments; 24 suites; 3 stories; reinforced concrete and hollow tile; court 40x30 ft.; lobby 34x18 ft.; cost \$45,000 to \$50,000; combined building 150x100 ft. (Lately noted.)

Md., Baltimore.—E. H. Sadtler is having plans prepared by Stanislaus Russell, 2900 Clifton Ave., Baltimore, and will call for bids to erect apartment-house in Walbrook; 3 stories; 15 apartments.

Md., Baltimore.—Newfield Building & Loan Corp., 1935 N. Eutaw St., purchased 3-story dwelling at 1037 N. Eutaw St. and is reported to convert into apartment-house.

Md., Baltimore.—Mayor Jas. H. Preston is having plans prepared by F. E. Beall, 206 St. Paul St., Baltimore, to convert 5 dwellings on St. Paul St., near Read, into apartment-house; 35 suites; cost \$55,000.

Va., Richmond.—R. L. Dibrell will repair brick apartment-house; cost \$6000.

ASSOCIATION AND FRATERNAL

Ala., Anniston.—National War Work Council, Y. W. C. A., Gertrude Mayo, 600 Lexington Ave., New York, will erect hostess-house at Camp McClellan.

Fla., Key West.—National War Works Council, Y. M. C. A., New York, will erect building at Naval Training Station; 38.6x73.3 ft.; wood army construction; 2-ply rubber roof; wood flooring; cost \$3500; wiring \$750.

Ga., Macon.—American Red Cross Assn., Washington, D. C., will erect convalescent-home at Camp Wheeler, adjoining convalescent-barracks.

La., Lake Charles.—Y. M. C. A. will erect additional building at Gerstner Field; A. M. Johnson, Secy. in charge.

Mo., St. Louis.—Masonic Home will alter building, 5351 Delmar St.; cost \$15,000.

N. C., Charlotte.—Knights of Columbus, John F. Deegan, Dist. Supvr., Washington, D. C., will erect clubhouse for soldiers; will also erect additional building at Camp Greene.

Va., Petersburg.—American Red Cross Association, Washington, D. C., will erect home for nurses at Camp Lee; also erect \$25,000 convalescent-house instead of \$10,000 structure as recently reported.

BANK AND OFFICE

La., Monroe.—Citizens' National Bank, C. E. Single, Prest., Clarks, La., purchased building and will remodel for bank.

Md., Baltimore.—Ritter-Conly Co. is having plans prepared by Ellicott & Emmart, 1101-02

Union Trust Bldg., Baltimore, for office building near Curtis Bay; brick or concrete; 1 story.

Md., Cumberland.—Geo. G. Young, Secy. Chamber of Commerce, representative of manufacturing company, acquired site at Harrison and Center Sts. for erection of office building.

Mo., St. Louis.—Equitable Building Co. will expend \$4000 to alter office building.

Mo., St. Louis.—Funch Lumber Co. will erect addition to office building; cost \$3000.

N. C., Greensboro.—American Exchange National Bank receives bids until May 7 for general contract heating, plumbing, electric wiring, marble and tile for bank and office building; 9 stories and basement; fireproof; reinforced frame; stone, brick, concrete and terra-cotta exterior facing; concrete slab and composition roofing; concrete composition, marble, tile and terrazzo floor construction; ornamental iron stairways; steam heat; electric lights; electric elevators; proposals for passenger elevators, vault work, hardware, electric fixtures and miscellaneous materials and equipment taken later; plans by Raleigh James Hughes, Greensboro, who may be addressed. (Lately noted.)

CHURCHES

Ala., Hartford.—Methodist Episcopal Church South receives bids through J. C. Holman, Chmn. Bldg. Committee, until May 15 for materials and labor for erection of building; plans and specifications on application to Mr. Holman; brick or brick veneer; concrete basement floors and sidewalk; cost \$15,000; C. W. Carlton, Archt., Chattanooga, Tenn. (Lately noted.)

Ark., Benton.—Methodist Episcopal Church will rebuild structure; cost \$12,000. Address The Pastor.

Ark., Benton.—First Baptist Church will rebuild structure. Address The Pastor.

Ark., Little Rock.—Second Baptist Church, Rev. Calvin B. Waller, Pastor, Donaghey Bldg., will erect building to replace structure damaged by fire; about 100x75 ft.; slate roof; concrete and hardwood floors; cost \$75,000. (Lately noted.)

Ga., Atlanta.—Wheat Street Baptist Church, Rev. P. Jas. Bryant, Pastor, will erect building to replace structure previously noted damaged by fire.

Ky., Louisville.—Mt. Lebanon Baptist Church, Rev. V. W. McLawler, Pastor, has plans by W. A. Rayfield & Co., Birmingham, Ala., for building; 52x125 ft.; ordinary construction; asbestos shingle roof; bowled pine floors; steam heat; electric lights; cost \$40,000; date opening bids not set. Address Architects. (Lately noted.)

La., Edgard.—St. John the Baptist Catholic Congregation has plans by Favrot & Livaudais, New Orleans, for building to replace burned structure; 55x135 ft.; brick and concrete; slate roof; wood floors; electric wiring; cost about \$60,000; bids opened in about a month. Address Building Committee, J. B. C. Grangard, Chmn., Edgard. (Lately noted.)

Miss., Forest.—N. W. Overstreet, Jackson, Miss., prepared plans for church building; brick; asphalt shingle roof; hot air heat; bids received May 10; cost \$11,000.

N. C., Durham.—Lakewood Baptist Church, Rev. H. F. Lindsey, Pastor, will move church and improve same.

Okla., Sallisaw.—First Presbyterian Church will erect building; bids opened; W. A. Matthews, Secy. Building Committee.

Va., Clifton Forge.—Christian Church has plans by H. L. Cain, 39 Merchants Natl. Bank Bldg., Richmond, for Sunday School building; 25x75 ft.; 2 stories; brick and stone; composition roof; wood floors; cost \$3000; steam heat \$500; electric lights, \$100; bids opened about May 15. Address architect.

Va., Colosse.—Colosse Baptist Church has plans by H. L. Cain, 39 Merchants Natl. Bank Bldg., Richmond, for Sunday School building; 21x70 ft.; 2 stories; brick; composition roof; wood floors; cost \$6000; steam heat, \$1000; bids opened about last of May. Address architect.

Va., Richmond.—Baptist Council of Richmond has plans by H. L. Cain, 39 Merchants Natl. Bank Bldg., Richmond, for Raleigh Forbes Memorial Baptist Church; 1 story; 48x56 ft.; brick; slate or tile roof; wood floors; cost \$5000; steam or hot-air heat \$500; electric lights \$100; construction by owners. Address architect. (Lately noted.)

W. Va., West Union.—Methodist Protestant Church Building Committee will erect building; 30x42 ft.; brick; slate roof; wood floors; gas heating and lighting; cement sidewalk; cost \$4000; construction begins May 1. Address G. W. Primm.

CITY AND COUNTY

Ga., Atlanta.—Home.—Fulton County Camms. will erect Arabian Home at Center Hill, for Helpless Women and Children of Convicts; plans include stone dormitory building; 60 to 70 rooms; cost \$20,000.

Ga., Home.—Jail.—Floyd County Camms. will soon call election on bonds to erect jail; cost about \$40,000. (Previously noted.)

N. C., Asheboro.—Home.—Randolph County Camms. are having plans prepared by H. J. Hopkins, Greensboro, N. C., for home. (See Machinery Wanted — Building Materials; Tile; Roofing; Cement and Lime.)

Okla., Pauls Valley.—Courthouse and Jail. Garvin County is having plans prepared by W. Main, Oklahoma City, for courthouse and jail. (See Courthouses.)

Okla., Tulsa.—Police Station.—City will erect additional rooms at police station; bids received until Apr. 29; plans and specifications at office Frank Newkirk, City Auditor, City Hall.

S. C., Charleston.—Offices.—Walker & Burden, Archts., 42 Broad St., Charleston, receive bids until April 29 to alter main and second floors of building at 14 George St. for Commrs. of Public Works, Water Dept.; plans and specifications at office architects as above.

S. C., Columbia.—Fire Station.—City will erect fire station at Camp Jackson. Address The Mayor.

Tenn., Chattanooga.—Auditorium.—City selected Clarence Jones, Hamilton Natl. Bank Bldg., and Chas. E. Bearden, First Natl. Bank Bldg., both of Chattanooga, to prepare plans for auditorium and soldiers' club; tentative plans include auditorium to seat 3300; shower baths, dormitory, cafeteria, gameroom, etc.; soldiers' club on lower floor; auditorium above; cost \$50,000. (Lately noted.)

Tenn., Chattanooga.—Pavilion, etc.—E. D. Heron, Commr. of Public Utilities, Grounds and Buildings, Room 25, City Hall, receives bids until Apr. 26 to alter and improve refreshment pavilion and theater building in Warner Park; plans and specifications at office C. E. Bearden, Archt., First Natl. Bank Bldg., Chattanooga.

Tenn., Kingsport.—Fire Station.—City will erect temporary fire station at Watauga St. and Wanola Ave. pending erection of proposed central station. Address The Mayor.

Va., Suffolk.—Market.—City is having plans prepared by R. H. Brinkley, City Engr., for improvements to city market. (Previously noted.)

COURTHOUSES

Okla., Pauls Valley.—Garvin County is having plans prepared by W. Main, Oklahoma City, for courthouse and jail; brick, stone and reinforced concrete. (Previously noted to have voted \$150,000 bonds to erect structure.)

DWELLINGS

Ark., Little Rock.—E. J. Tauchskolb will erect residence on Ridgeway, Midland Hills.

Ark., Little Rock.—R. J. Rice of Twin City Bank, North Little Rock, will erect bungalow.

Ark., Little Rock.—B. L. Uimer will erect \$2000 residence.

Ark., Little Rock.—S. E. Wiggins will erect 1-story \$2550 residence at 623 Spruce St., \$2650 residence at 711 Spruce St., 2-story frame \$2250 residence at 298 Izard St., and repair residence at 303 Rector Ave., at cost of \$1000.

Ark., Stuttgart.—W. B. Wall will erect residence; cost \$4000.

D. C., Washington.—H. R. Howenstein, 1314 F St. N. W., has plans by W. E. Howser, Washington, for residence at 1129-37 Morse St. N. E.; 2 stories; brick; tin roofs; pine floors; hot-water heat; electric lights; total cost \$12,500. Address owner. (Lately noted.)

D. C., Washington.—D. J. Dunigan, 203 Bond Bldg., has plans by W. E. Howser, 37 New York Ave. N. E., Washington, for dwellings 2905-27 Illinois Ave. N. W.; cost \$54,000; construction by owner.

D. C., Washington.—Jan. E. Joyce will remodel dwelling, Alabama Ave., Garfield Heights; cost \$2000; construction by owner.

D. C., Washington.—Boss & Phelps, 714 14th St. N. W., has plans by A. H. Sonnenman, 1334 H St. N. W., Washington, for remodeling dwelling 1406 H St.; construction by owners.

D. C., Washington.—G. V. and C. H. Small, 614-22 11th St. N. W., have plans by Geo. T. Santmyers, 921½ New York Ave. N. W., Washington, for dwelling 3303-05 Macomb St. N. W.; cost \$16,000; construction by owners.

D. C., Washington.—Clarence Small, 923 Massachusetts Ave. N. W., has plans by Frank White & Co., Washington, for dwelling 2829-41 Connecticut Ave.; cost \$23,500; construction by owner.

D. C., Washington.—J. L. Knopp, 1929 Jackson St. N. E., has plans by C. F. Reed, Hyattsville, Md., for dwelling 1912 Irving St. N. E.; cost \$3000; construction by owner.

Fla., Jacksonville.—H. Taylor & Son will erect brick veneer dwelling; cost \$4800.

Fla., Tarpon Springs.—Water Topliff will erect residence at Indian Beach.

Ga., Atlanta.—O. J. Lane will erect residence; 1 story; brick veneer; cost \$2300.

Ga., Atlanta.—Mrs. E. S. Richards will erect brick veneer dwelling; cost \$4500.

Ga., Atlanta.—H. B. Nash will erect two dwellings.

Ga., Butler.—Mrs. Frank Holmes, Macon, Ga., is having plans prepared by Curran R. Ellis, Ellis Bldg., Macon, for residence near Butler; 2 stories; brick; rift pine floors; hot-water heat; domestic lighting and water-works; cost \$4000.

Ga., Columbus.—J. B. Knight will erect \$15,000 residence.

Ga., Covington.—W. R. Roberts has plans by Thos. M. Campbell, Johnson Bldg., Augusta, for residence; 71x90 ft.; brick exterior and hollow tile; hardwood floors; promenade tile terrace and porch floors; tile bathrooms; cost \$15,000; bids opened May 1.

Ga., Lagrange.—H. W. Caldwell has plans by C. E. Frazier, Atlanta, for residence; 40x60 ft.; brick veneer; composition slag roof; tile porch floors; other floors, rift pine; steam heat; electric lights; day labor. Address owner. (Lately noted.)

Ga., Macon.—Mr. Swearingner, care National Cash Register Co., is having plans prepared by Curran R. Ellis, Ellis Bldg., Macon, for bungalow; frame; tile baths; asphalt shingle roof; furnace heat; cost \$4000.

Ga., Macon.—W. C. Dorsett is having plans prepared by P. E. Dennis, Citizens & Southern Bank Bldg., Macon, for residence; brick veneer; 1 story; tile roof; cost \$7500.

Ky., Hazard.—Midland Coal Co. will let contract within 10 days to erect 39 miners' houses.

Ky., Millstone.—South East Coal Co. will build 12 miners' houses on Webb's Branch of Thornton Creek.

Ky., Mt. Sterling.—Lee Orear will repair residence lately noted damaged by fire at loss of \$3000.

Ky., Roxana.—Kentucky & West Virginia Coal Co. will let contract within 2 weeks to erect 50 miners' houses.

Ky., Whitesburg.—Powell Coal Co., Chas. B. Powell, Mgr., will erect 50 miners' houses; will let contract within 2 weeks.

La., New Orleans.—Louise Moulezum will erect residence at 6145 St. Charles Ave.

Md., Baltimore.—John Jessnitz, 807 S. 5th St., will erect 8-room residence in Park Grove.

Md., Monks.—Monks Roller Mills, Inc., Otis E. McCoy, Pres., 417 Equitable Bldg., Baltimore, Md., will construct 18 ready-cut houses, bungalow type; 4 to 5 rooms and bath, for employees. (See Machinery Wanted—Houses; Plumbing.)

Mo., St. Louis.—George Balzar will remodel dwelling; cost \$9000.

Mo., St. Louis.—Wm. Lempe will erect 1-story dwelling; cost \$2500.

N. C., Statesville.—R. V. Brawley will erect 9-room brick residence.

N. C., Statesville.—Statesville Cotton Mill will enlarge and improve number of tenant-houses.

N. C., Statesville.—Herbert Hoffman will erect brick residence.

S. C., Spartanburg.—C. C. Kirby will erect residence to replace structure burned at loss of \$2500; 8 rooms; frame; metal roof.

Tex., El Paso.—A. A. Lawler will erect \$4000 bungalow at 2900 Alamogordo St.

Tex., El Paso.—Dr. J. D. Love will erect residence; 6 rooms; brick; composition roof; pine and hardwood floors; cost \$3000; hot-air heat, \$200; lighting, \$100; cement sidewalks, about \$200. (Lately noted.)

Tex., Fort Worth.—S. O. Hartman will erect \$2200 residence.

Tex., Fort Worth.—Mrs. S. C. Jackson will erect residence; cost \$2500.

Tex., Fort Worth.—C. Stockton will erect residence; brick; cost \$2500.

Tex., Houston.—F. G. Marett will erect 2 residences; 6 rooms; frame and stucco; cost \$2750.

Tex., Houston.—F. Willford will erect 4 residences on Wilson St.; cost \$4650.

Tex., San Antonio.—W. Heathon will erect residence; 3 rooms; cost \$2200.

Tex., San Antonio.—E. Melrito will erect 5-room residence; cost \$2400.

Tex., San Antonio.—H. F. Hicock will erect 6-room residence; cost \$3000.

Tex., San Antonio.—J. J. Floharty will erect 5-room dwelling; cost \$2100.

Tex., Weatherford.—Jim Holmes will erect bungalow.

Tex., Wichita Falls.—H. N. Martin has plans by Sanguinet, Staats & Pate, 507 Kemp & Kell Bldg., Wichita Falls, for residence; 10 rooms and basement; 50x47 ft.; outer walls brick trimmed with Luders stone; Carthage stone steps; front and rear porches with tile floors; tile floors and wainscoting in bathrooms and kitchen; first-floor rooms finished in red gum with quarter-sawn oak floors; second-story floors, maple with birch trimmings; billiard-room in basement furnished in red gum with maple floors; cost \$40,000.

Va., Norfolk.—E. L. Creech will erect 2 frame dwellings; cost \$2600.

Va., Norfolk.—J. D. Stone will erect residence; cost \$2600.

W. Va., Moundsville.—Wm. Davis will erect residence.

GOVERNMENT AND STATE

Ala., Anniston.—Y. W. C. A.—National War Work Council, Y. W. C. A., Gertrude Mayo, 660 Lexington Ave., New York, will erect hostess-house at Camp McClellan. (See Association and Fraternal.)

Fla., Arcadia.—Aviation Camp.—War Dept., Washington, D. C., will enlarge aviation camp at Carlstrom Field; plans include messhouse, 2 hangars, etc.

Fla., Cutler.—Aero-Gunnery School.—War Department, Washington, D. C., will establish aero-gunnery school accommodate 2000 to 5000 men.

Fla., Key West.—Association.—National War Works Council, Y. M. C. A., New York, will erect building at Naval Training Station; 38,679.3 ft.; wood; rubber roof; wood floors; cost \$3500. (See Association and Fraternal.)

Fla., Tampa.—Barracks.—War Dept., Washington, D. C., will erect barracks to accommodate soldiers guarding Tampa shipyards; Geo. A. Miller, Tampa, submitted plans and estimates.

Ga., Atlanta.—Camp.—War Dept., Washington, D. C., will double size of Camp Gordon; construct number reinforced concrete warehouses, refrigerating plant, laundry, etc.; estimated cost \$4,000,000; also erect reconstruction hospital at Fort McPherson; total cost about \$1,500,000. (Lately noted in part.)

Ga., Fort Oglethorpe.—Hospital.—War Department, Washington, D. C., will erect another base hospital, No. 57, at Camp Greenleaf; also erect 24 additional hospital buildings on McDonald field. (See Hospitals.)

Ga., Macon.—Barracks, Etc.—War Department, Washington, D. C., will construct additional buildings at Camp Wheeler to include reclamation barracks, miscellaneous warehouse, magazine for ordinance department, additional stables at remount depot, 29x170 ft., laboratory at base hospital, etc.; Maj. A. C. Doyle, Constr. Quartermaster, Camp Wheeler.

Ga., Macon.—Convalescent Home.—American Red Cross Assn., Washington, D. C., will erect convalescent home at Camp Wheeler adjoining convalescent-barracks. (See Association and Fraternal.)

La., Lake Charles.—Association.—Y. M. C. A. will erect additional building at Gerstner Field; A. M. Johnson, Secy. in charge. (See Association and Fraternal.)

Md., Baltimore.—Barracks.—War Dept., Washington, D. C., plans to erect barracks for 600 employees of Quartermaster's Dept.; considering sites; James Carey Martien, Local Representative of Dept., 9th Floor Lexington Bldg., Baltimore.

Miss., Meridian.—Postoffice.—B. F. Hyde, Custodian, Meridian, receives bids until May 16 for miscellaneous repairs to postoffice; drawings and specifications at office custodian only.

N. C., Charlotte.—Association.—Knights of Columbus, John F. Deegan, Dist. Supvr., Washington, D. C., will erect additional building at Camp Greene, also erect clubhouse for soldiers in Charlotte. (See Association and Fraternal.)

S. C., Charleston.—Warehouses, etc.—War Dept. is reported to expend \$20,000,000 to construct concrete piers with frontages of 3000 to 5000 ft.; concrete warehouses and quarters for men in charge; construction under supervision of Maj. J. L. Lee, Charleston.

Tex., Dallas.—Postoffice.—Treasury Department, Jas. A. Wetmore, Acting Supervising Archt., Washington, D. C., will make miscellaneous repairs to postoffice; bids received by B. M. Burgher, Custodian, Dallas, until Apr. 24; plans and specifications at office custodian.

Va., Cape Charles.—Quarantine Station.—Treasury Dept., Jas. A. Wetmore, Acting Supervising Archt., Washington, opens bids May 16 to construct 12 additional buildings and remodel attendants' quarters at United States Quarantine Station, Craney Island, Cape Charles; drawings and specifications from custodian of station and Mr. Wetmore as above.

Va., Petersburg.—Nurses' Home, etc.—American Red Cross Assn., Washington, D. C., will erect home for nurses at Camp Lee. (See Association and Fraternal.)

Va., Portsmouth.—Barracks.—War Dept., Washington, D. C., will erect barracks to accommodate 400 Government employees.

HOSPITALS, SANITARIUMS, ETC.

Ga., Atlanta.—War Dept., Washington, D. C., will erect reconstruction hospital at Fort McPherson. (See Government and State.)

Ga., Fort Oglethorpe.—War Dept., Washington, D. C., will erect another base hospital, No. 57, at Camp Greenleaf; also erect 24 additional hospital buildings on McDonald field; Maj. F. D. Smythe, Ft. Oglethorpe, may be addressed.

N. C., Morganton.—State has plans by Chas. C. Hook, Charlotte, N. C., for infirmary building at North Carolina School for the Deaf; 2 stories and basement; reinforced concrete; cost \$25,000; day labor. (See Schools.)

W. Va., Charleston.—Dr. G. A. MacQueen, Chmn., has plans by W. T. Vandegriff, P. O. Box 536, office 809 Union Trust Bldg., Charleston, for addition to Kanawha Valley Hospital; 34x66 ft.; 4 stories and basement; reinforced concrete columns and beams; C. A. P. Turner floor slabs; metal roof; 1-pipe overhead gravity heating plant; light from local plant; contract let about May 1. (Lately noted.)

W. Va., Huntington.—Chesapeake & Ohio Ry. Co., F. I. Cabell, Ch. Engr., Richmond, Va., states company does not contemplate erecting hospital at present time. (Lately

noted considering tentative plans for hospital.)

HOTELS

Ark., Glenwood.—W. A. Halliburton, Little Rock, Ark., is promoting erection of \$50,000 hotel.

Ark., Mountain Home.—Mrs. Bertie Blackstone, Picher, Okla., purchased Commercial Hotel and will remodel.

Fla., Miami.—Salem Graham will erect 20x50-ft. addition to Gralyn Hotel; 4 stories and basement; reinforced concrete; storage and servants' quarters.

Fla., Moore Haven.—South Florida Farms Co., Clarence M. Busch, Pres., will erect 2 hotels lately noted; 40x209 ft. and 40x115 ft.; frame; built-up roof; wood floors; city electric lights; cost about \$40,000; plans by Josiah Connoose, care of company. (See Machinery Wanted—Plumbing; Electric Materials.)

Ga., Moultrie.—Chamber of Commerce is reported interested in incorporating company to erect \$200,000 hotel.

La., Monroe.—Doughtie Hotel Co., Ltd., will erect addition to Hotel Monroe; 4 stories; 40x160 ft.; brick and steel; wood and tile floors; steam heat; roofing not decided; cost \$60,000 to \$75,000; lighting from gas engine, \$5250; elevators, \$3000; bids opened by June 1. (Lately noted.)

S. C., Charleston.—Hasell-Meeting Realty Co. has plans by J. D. Newcomer, 32 Broad St., Charleston, and lets contract about May 9 to erect addition to Argyle Hotel; 4 stories; 180x43 ft.; brick; 60 rooms with private bath; store, 180x120 ft.; tin roof; electric lights; also improve present building by installing elevator, enlarging lobby, boiler-room, barber shop, changing stairway, etc.; cost \$65,000 to \$70,000. (Lately noted.)

S. C., Columbia.—Thos. L. Conder purchased hotel and will repair building.

W. Va., Point Pleasant.—John Rock, Prop. Spencer Hotel is reported to remodel and refurnish hotel.

MISCELLANEOUS

Ga., Atlanta.—Cafe.—Eagle Cafe will improve building at 11 Marietta St.

Ga., Moultrie.—Restaurant.—Swift & Co. will erect restaurant for 500 employees; cost \$25,000; also erect garage.

Md., Baltimore.—Sheds.—Wright & Gibson Co., Pittsburgh, Pa., will erect number of buildings and sheds. (See Coal Mines and Coke Ovens.)

S. C., Charleston.—Home.—Florence Crittendon Home, Claudia Tharin, Supt., is having plans prepared by J. D. Newcomer, Charleston, for building; 3 stories; brick; several sun porches; accommodate 40; cost \$30,000. (Lately noted.)

RAILWAY STATIONS, SHEDS, ETC.

Ala., Decatur.—Louisville & Nashville R. R., W. H. Courtenay, Ch. Engr., Louisville, will improve and enlarge passenger depot.

Ga., Atlanta.—Atlanta & West Point R. R., A. B. Edge, Div. Engr., will expend \$5000 to improve warehouse at Lakewood Ave. and railroad crossing, including installation of office space; construction by lessee.

Ga., Brunswick.—Southern Railway Co., B. Herman, Ch. Engr., M. W. & S. Lines East, Charlotte, N. C., Atlantic Coast Line R. R., J. E. Willoughby, Wilmington, N. C., and Atlanta, Birmingham and Atlantic Ry., L. L. Beall, Ch. Engr., Atlanta, will improve union depot; construct shed, tracks, etc.

Okla., Tulsa.—Atchison, Topeka & Santa Fe Ry., H. W. Wagner, Ch. Engr., Topeka, Kan., will erect \$100,000 passenger station at First and Second Sts.; reinforced concrete with front of Navajo brick; 2 stories; main building 137½x40 ft. with 33x90 ft. wing; also erect freight depot; 2 stories; 350 ft. long; terminal yards to have trackage of about 10 mi.; install electrical interlocking system; total expenditure estimated at \$2,000,000; C. E. Briggs, engineer in charge of construction. (Lately noted.)

W. Va., Montgomery.—Chesapeake & Ohio Ry. Co., F. I. Cabell, Ch. Engr., Richmond, Va., will erect depot; 2 stories; brick; 1200 ft. of shed room; cost \$35,000.

SCHOOLS

Ala., Mobile.—Mobile County Board of Commrs. will erect Rosenwald school building at Chestang.

Ala., Thorsby.—Thorsby Institute Trustees will rebuild dormitory noted damaged by fire at loss of \$6000.

Ala., Town Creek.—City voted \$5000 bonds to erect school; this amount will be supplemented by \$4000 donation. Address The Mayor.

Ark., Camden.—School Board is having plans prepared by Theo. M. Sanders, Little Rock, for repairs to school; cost \$20,000; hot-water heat, \$2900; construction probably on percentage basis. (Lately noted.)

Ark., Engleberg.—Trustees will erect school. Address H. Y. Koecher.

Fla., Palatka.—County School Board has plans by Mark & Sheftall, Clark Bldg., Jacksonville, for school building. (Lately noted to have voted \$85,000 school-building bonds.)

Fla., Vero.—Special School Tax Dist. No. 11 is having plans prepared by Mark & Sheftall, Jacksonville, for school building for which \$25,000 bonds were lately noted voted.

Ga., Atlanta.—Board of Education has plans by architectural department of Georgia School of Technology, Atlanta, for Eighth Ward School and Oakland City School; construction under supervision of W. W. Lotspeich, Supervising Archt. for city schools. (Lately noted.)

Ga., St. Clair.—Boggs Academy of Georgia will erect dormitory; 30x50 ft.; 3 stories; O. M. Topp, Jenkins Arcade, Pittsburgh, Pa.

Ga., Wrightsville.—City will issue \$20,000 school bonds. Address The Mayor.

La., Ashland.—School Trustees will probably rebuild high school noted damaged by fire at loss of \$10,000.

La., Kinder.—Kinder School Dist. voted \$60,000, to be supplemented by \$12,000 insurance, to erect school to replace burned structure. Address Allen Parish School Board, Oberlin, La. (Lately noted.)

Md., Upper Marlboro.—Governor approved bill providing for erection of high school; E. S. Burroughs, County School Supt.

Md., Westminster.—Governor signed bill authorizing Carroll County Commrs. to borrow money for school building in county.

Miss., Anguilla.—City is having plans prepared by N. W. Overstreet, Jackson, Miss., for school building; flat built-up roof; steam heat; cost \$20,000; bids received within 30 days.

Miss., Booneville.—Trustees have plans by R. A. Heavener, Jackson, Tenn., for 2-story and basement school building for which \$25,000 bonds were lately noted voted; bids opened.

Miss., Forest.—School Board will erect building; brick; flat pitch and gravel roof; reinforced concrete foundation; concrete floors on first floor; steam heat; bids received May 10; N. W. Overstreet, Archt., Jackson, Miss.

Miss., Guntown.—Guntown Dist. of Lee County, F. P. Epting, Clerk, is reported to issue \$6500 bonds to erect school.

Miss., Purvis.—N. W. Overstreet, Jackson, Miss., prepared plans for dormitory; 40 rooms; brick; asphalt shingle roof; steam heat; cost \$15,000.

Miss., Summit.—Board of Trustees, Pike County Agricultural High School, W. B. Mixon, Secy., Magnolia, Miss., receives bids until May 6 to erect school building, including electric wiring; bids asked on both brick and frame buildings; plans and specifications at office Xavier A. Kramer, Archt., Magnolia, and Mr. Mixon as above. (Lately noted.)

Mo., Kennett.—McKay School Dist. will soon vote on bonds to erect school; School Dist. No. 41, Two Mile Island, will erect school. Address Dunklin County Commrs.

N. C., Morganton.—State has plans by Chas. C. Hook, Charlotte, N. C., for infirmary building for North Carolina School for the Deaf; 50x80 ft.; 2 stories and basement; reinforced concrete; slate roof; steam heat; dumbwaiters; cost \$25,000; day labor. Address E. McGoodwin. (Previously noted.)

Okla., Luther.—School Board Dist. No. 8 has plans by Hawk & Parr, Oklahoma City, for addition to and remodeling school. (Lately noted.)

Okla., Norman.—Norman School Dist. has plans by L. E. Bailey, Norman, for ward school; 51x183 ft.; brick finished with granite; tar and gravel Barrett specification roof; hardwood floors over concrete; steam heat; electric lights; cost \$30,000; bids advertised in about 10 days. Address Chas. S. Standley, Clerk. (Lately noted.)

Okla., Stillwater.—Board of Education is having plans prepared by Hair, Tonli & Bramblett, 417 Terminal Bldg., Oklahoma City, for school; 2 stories; 80x150 ft.; cost \$75,000. (Lately noted.)

S. C., Snoaks.—Snoaks School Dist. is considering voting on bond issue to erect

school building. Address Dist. School Trustees.

Tex., Bynum.—Trustees have plans by T. J. and J. O. Galbraith, Slaughter Bldg., Dallas, and Elks' Bldg., Hillsboro, Tex., for school building; 3 stories; brick; about 60x80 ft.; semi-fireproof; concrete skeleton; wood floors; room heaters; bids opened April 24; plans and specifications at office architects as above. (Previously noted.)

Tex., Riverside.—Riverside Independent School Dist. votes on \$12,000 bonds to erect school building; S. F. Houtchens, Secy. of School Board.

Va., Charlottesville.—University of Virginia let contract to Charlottesville Lumber Co. to erect 7 buildings for United States Army School for Truck Drivers; accommodate 600 men, 7 officers and 40 instructors; plans include 3 standard quartermaster's barracks each 43x14 ft.; 3 lavatories 14x16 ft.; garage and machine shop; 50x200 ft.; frame; felt roof; wood floors in barracks; other floors concrete; city electric lights; cost \$50,000. J. L. Newcomb, Prof. of Civil Engineering, in charge of school. Address Contractor. (Lately noted.)

W. Va., Charleston.—Charleston School Dist. votes May 14 on \$15,000 bonds to erect 4-room brick school at Phiffer, 4-room frame at Sugar Creek and addition at Oak Hill; D. Dietrick, Pres. Board of Education.

W. Va., Jacksonburg.—Board of Education of Grant Dist., A. L. Chambers, Pres., Smithfield, W. Va., receives bids until May 1 to erect two 10-room schools at Jacksonburg and Smithfield; drawing and specifications from Mr. Chambers at Smithfield, and Holmboe & Lafferty, Archts., Clarksburg, W. Va. (See W. Va., Smithfield.)

W. Va., Smithfield.—Board of Education of Grant Dist., A. L. Chambers, Pres., receives bids until May 1 to erect two 10-room schools at Jacksonburg and Smithfield; bids for each building complete except plumbing, sewerage, gas fitting, electrical work, heating and ventilating system; separate bids for plumbing, sewerage, gas fitting and electrical work for each building; separate bids for heating and ventilating systems and separate bids for each branch of general work; drawings and specifications at office Mr. Chambers, Smithfield, and Holmboe & Lafferty, Archts., Clarksburg, W. Va.

STORES

Ark., Glenwood.—Home Supply Mercantile Co. will erect block of brick business buildings.

Ark., Letona.—J. C. Mahan will erect business building.

Fla., Miami.—Maire Brothers, Lima, Ohio, are reported to erect several business buildings.

Fla., Miami.—Ulendorff & Nichols have plans by Geo. L. Pfeiffer, Lemon City, Fla., for business building at 12th St. and Avenue D; 50x105 ft.; concrete skeleton and walls; built-up composition roof; wood floors on concrete; cost \$12,000; bids opened May 1 for materials only; construction by owner.

Ga., Aline.—J. S. Sanders will receive bids to erect brick business building; 32x90 ft.; plate-glass front; completion by Aug. 1.

Ga., Aline.—J. S. Sanders is receiving bids to erect business building; brick; 32x90 ft.; plate-glass front.

Ga., Bartow.—Smith Bros. & Co. have plans by P. E. Dennis, Macon, Ga., for proposed store building; 1 story; 100x100 ft.; brick; tin roof; plate-glass front; tile vestibule; cost \$17,500; construction by day labor.

La., Alexandria.—Progressive Company, J. E. McAdams, Pres., acquired building at Third and Johnston Sts. and will remodel.

Md., Brunswick.—Mrs. Sadie Mehring will erect store to replace structure lately noted damaged by fire.

Mo., Kansas City.—E. Shukert is having plans prepared by C. P. Schmidt, Shukert Bldg., Kansas City, to erect 4-story and basement mercantile building at 1021-23 Grand Ave. to replace structure previously noted damaged by fire.

N. C., Bath.—W. O. Windfield and Dr. J. T. Nicholson will erect store building to replace structures lately noted damaged by fire; 40x60 ft. and 40x100 ft.; brick and wood; metal roof; wood and cement floors. Address Dr. Nicholson.

S. C., Charleston.—Hasell-Meeting Realty Co. has plans by J. D. Newcomer, 32 Broad St., Charleston, and lets contract about May 9 to erect addition to Argyle Hotel; plans include store 180x120 ft. (See Hotels.)

Tex., Dallas.—C. H. Schoellkopf will erect

2-story store building to be leased by Anderson Furniture Co.

Tex., Elmo.—Bruzzel & Son deferred erection of business building until fall; structure to be 25x50 ft.; hollow tile; metal roof. (Previously noted.)

Tex., San Angelo.—G. W. Littlefield, Austin, and J. W. White, Mason, Tex., will remodel 2 business buildings on Concho St.

Va., Portsmouth.—H. Silverman & Bro. will erect 2-story brick store; cost \$15,000.

W. Va., Charleston.—O. J. Morrison and associates purchased Burtwell Theater and are reported to reconstruct and erect several additional stories to building for department store.

THEATERS

Fla., Miami.—Edwin Baker leased Hippodrome Bldg. at 12th St. and Ave. B; will remove roof and remodel building for air-dome; seating capacity 650.

Ga., Atlanta.—Wm. Oldknow will expend \$5000 to remodel Odeon Theater at 87 Peachtree St.

Tenn., Chattanooga.—E. D. Herron, Commr. of Public Utilities, Grounds and Buildings, Room 25, City Hall, receives bids until Apr. 26 to alter and improve refreshment pavilion and theater building in Warner Park. (See City and County.)

WAREHOUSES

Ala., Whatley.—Lyman-Brownlee Lumber Co., Luther Lyman, Pres., will erect ware-

houses in connection with sawmill, etc. (See Lumber Manufacturing.)

Ga., Atlanta.—War Dept., Washington, D. C., will double size of Camp Gordon. (See Government and State.)

Ga., Atlanta.—Atlanta & West Point R. R., A. B. Edge, Dir. Engr., Atlanta, will alter warehouse and install office space; construction by lessee. See Railway Stations, Sheds, etc.)

Ga., Macon.—War Department, Washington, D. C., will erect miscellaneous warehouse, magazine for ordnance department, etc. at Camp Wheeler. (See Government and State.)

Mo., St. Louis.—James Ballard will repair warehouse; cost \$8000.

N. C., Rowland.—Rowland Tobacco Warehouse Co. Incptd. with \$50,000 capital by A. D. McKenzie and others.

N. C., Kinston.—Farmers' Tobacco Warehouse Co. Incptd. with \$100,000 capital by Henry Tull, E. T. Woten and C. Oettinger.

N. C., Zebulon.—Farmers' Warehouse of Zebulon, Inc., authorized with \$20,000 capital by C. G. Weathersby, W. N. Pitts and A. G. Kemp.

S. C., Charleston.—War Dept., Washington, is reported to expend \$20,000,000 to build warehouses, piers, etc. (See Government and State.)

Tex., Houston.—Humble Oil & Refining Co. will erect concrete warehouse; cost \$17,500.

BUILDING CONTRACTS AWARDED

APARTMENT-HOUSES

Ga., Atlanta.—W. C. Jackson, Chicago, let contract to Flagler Co., 1519 Healey Bldg., Atlanta, to erect 2-story apartment-house; brick veneer; composition roof; oak and pine floors; cost \$35,000; heating, about \$4500. Address contractor. (Lately noted.)

Okla., Tulsa.—F. A. Banister, 915 Olive St., St. Louis, let contract to erect 2 apartment buildings; 40x41 ft.; brick, wood and iron; composition roof; wood floors; natural gas heat; electric lights; cost \$22,000; Nolte & Nauman, Archts., St. Louis. (Lately noted.)

Tex., Texarkana.—Mrs. W. A. Hargett let contract to H. A. Adams, Texarkana, Ark., to erect apartment house; 36x68 ft.; brick; slate coat roof; yellow pine floors; cost \$10,000; Stewart Moore, Archt., Texarkana. (Lately noted.)

BANK AND OFFICE

Ark., Conway.—Directors of Farmers' State Bank let contract to W. F. Ault, Little Rock, to erect 2-story fireproof brick and concrete building on site of present structure; cost \$55,000.

Fla., Clearwater.—Bellevue Hotel let contract to erect building to contain swimming pool, etc.; offices and stores on ground floor. (See Hotels.)

Md., Baltimore.—Baltimore Drydock & Shipbuilding Co., Holden A. Evans, Pres., let contract to West Construction Co., American Bldg., Baltimore, for addition to office building on Fort Ave., 4 stories; fireproof; reinforced concrete; brick walls; slag roof; cement and wood floors; steam heat; electric lights; cost about \$10,000; Otto G. Simonson, Archt., Maryland Casualty Tower Bldg., Baltimore. (Lately noted.)

S. C., Florence.—E. M. Matthews Co., Inc., J. L. Freidheim, Pres.-Gen. Mgr., let contract to Haynesworth & Lawton, Florence, to rebuild old Florence Iron Works building for offices, drug store, warehouses, etc. (See Stores.)

Tex., Ranger.—Farmers & Merchants State Bank let contract to J. M. Morgan, Big Springs, Tex., to erect bank building; cost \$21,000; David S. Castle, Archt., Abilene, Tex. (Previously noted.)

Tex., San Antonio.—Central Trust Co. let contract to J. P. Haynes, 345 Moore Bldg., San Antonio, to erect bank and office building; 12 stories; 56x150 ft.; steel and reinforced concrete; 20-year tar and gravel roof; cement-floor construction; cost \$500,000; steam heat \$45,000; electric lights \$15,000; P. M. Bruner, sidewalk and vault lights \$1500; Sanguinet, Stants & Boelhaue, Archts., San Antonio. (Previously noted.)

W. Va., Mullens.—D. J. Phipps, Roanoke, Va., general contractor to erect bank and hotel building for Bank of Wyoming, let following sub-contracts: Plumbing and heating, W. A. Bodell; painting, C. B. Whitlow; both of Bluefield, W. Va.; millwork, Exchange Lumber Co.; electric work, Richardson-Wayland Electric Co.; steel work, Roan-

oke Bridge & Iron Co.; roof and sheet metal, R. H. Lowe & Co.; marble and tile, Roanoke Vitrolite & Marble Works; miscellaneous and ornamental iron, Roanoke Iron Works; all of Roanoke, Va.; plastering, Gonyea Brothers, Bristol, Tenn.; lumber, Guyan Lumber Co., Herndon, W. Va.; pressbrick, Iron Clay Brick Co., Columbus, Ohio; plaster, United States Gypsum Co., Saltville, Va.; metal frames, Building Supplies Corp., Richmond, Va.; cut stone, Ingalls Stone Co., Bedford, Ind.; cement, Carney's Cement Co., Mankato, Minn.; cement, Clinchfield Portland Cement Corp., Kingsport, Tenn.; common brick, Charleston Materials Co., Charleston, W. Va.; water-proofing, Barber Asphalt Paving Co., Philadelphia, Pa.; fire escapes, Price-Evans Foundry Co., Chattanooga, Tenn.; carpenter work, concrete work and brick work by day labor; plans by G. R. Ragan, Roanoke, Va., call for 7-story structure; 60x90 ft.; brick, steel frame, limestone and cement; Barrett specification roof; wood floors; steam heat; electric lights; electric elevator; cost \$147,000. (Previously noted.)

CHURCHES

Ark., Vilonia.—Trustees let contract to Oliver Graham, Vilonia, to erect school addition; 46x60 ft.; frame; shingle roof; wood floors; cost \$3000; construction begins July 1. (Lately noted.)

Ky., Winchester.—Geo. E. Tomlinson, Winchester, Chrm. Building Committee for First Methodist Episcopal Church, let contract to Bowman & King Stone Co., Bloomington, Ind., for stone, and to Grainger & Co., Louisville, Ky., for iron and steel; Mr. Tomlinson may be addressed for other bids; plans by John Gaisford, Memphis, Tenn., call for stone construction; tile roof; wood cork-covered floors; steam heat; electric lights; concrete sidewalks; cost \$50,000. (Lately noted.)

S. C., Holly Hill.—Corinth Baptist Church, Rev. D. W. Holt, Pastor, will erect brick building near Holly Hill; John Mitchell, Contr., Orangeburg, S. C. (Lately incorrectly noted at Corinth N. C.)

Tenn., Athens.—Baptist Church, Rev. S. B. Ogle, pastor, let contract to U. S. Beard, Sweetwater, Tenn., to erect \$2000 addition to building.

Tenn., Greenfield.—E. G. Parish, Jackson, Tenn., has contract to erect brick building for which A. J. Barton is Chmn. of Bldg. Committee; ordinary construction; composition built-up roof; steam heat; electric lights; cost \$20,000; construction begins May 1; R. A. Heavner, Archt., Jackson, Tenn.

Tex., Athens.—First Baptist Church let contract to Walter G. Shaddy, Athens, to erect building; 60x100 ft.; brick; wood joists and floors; composition built-up roof; cost \$32,000; Geo. Lindsey, Archt., Athens.

Va., Newport News.—United States Shipping Board, Emergency Fleet Corp., J. Rogers Flannery, Director of Housing, 1319

F St. N. W., Washington, D. C., is reported to have let contract to Mellon-Stuart Co., Pittsburgh, Pa., to erect churches, dwellings, etc., at Hilton. (See Dwellings.)

CITY AND COUNTY

Ala., Birmingham.—Theater.—City Commn. let contract to Jas. L. Carey, Birmingham, to erect open-air theater. (See Theaters.)

COURTHOUSES

Miss., Corinth.—E. G. Parish, Jackson, Tenn., general contractor to erect courthouse for Alcorn County, let following sub-contracts: J. R. Johnston, Jackson, Tenn., brick and hollow tile; Atlanta Terra-Cotta Co., Atlanta, terra-cotta; Truscon Steel Co., Youngstown, Ohio, metal tile and reinforced concrete rods; R. C. Bruce, Dyer, Tenn., painting; Decatur Cornice & Roofing Co., Albany, Ala., steel and cast iron; Central Mosaic Tile Co., Memphis, Tenn.; Enchosa Lumber & Mfg. Co., Jackson, Miss., sash and doors; will probably let contract for Barrett roofing to Bartholomew Roofing Co., Memphis, Tenn.; plans by N. W. Overstreet call for structure 95x124 ft.; fireproof; composition roof; reinforced concrete floors; steam heat; cost about \$97,000. (Lately noted to open bids May 8 for heating, plumbing, lighting and clocks.)

Tex., Sherman.—Grayson County Commrs. Court let following contracts for remodeling courthouse: General contract, J. C. Hamilton; plumbing, Joe C. Koriolth Plumbing Co.; electric work, Kolk Electric Co., all of Sherman; cost \$12,164; John Tulloch, Archt., Sherman.

DWELLINGS

Fla., Jacksonville.—J. H. Delcher, 329 Gilmore St., let contract to Henry Taylor & Son, 2835 Oak St., Jacksonville, to erect residence; 35x52 ft.; brick veneer; composition roof; oak floors; furnace heat; electric lights; cost \$4900; plans by Henry Taylor, 2825 Oak St.

Fla., Miami.—B. F. Tobin of Continental Motors Corp., New York, has plans by W. C. De Garmo, Miami, for residence; Spanish renaissance; 83x72 ft.; 2 stories; stucco over hollow tile; Spanish tile roof; stone trim; serafino frieze around exterior; porte cochere; iron balconies and grillwork; sunken garden with blue tile lined swimming pool; laundry in separate building; construction under supervision of Alexander Middlemases, Miami; J. B. Orr, Miami, has contract for tile and exterior and interior plastering. (Lately noted.)

Ga., Atlanta.—Dr. Lucian L. Knight let contract to Fulton County Home Builders, Atlanta, to erect 2-story brick-veneer and stucco dwelling; cost \$10,000.

Ga., Atlanta.—B. W. Gibson, 193 Angier Ave., let contract to T. O. Clem, 253 Highland Ave., Atlanta, to erect residence; 6 rooms; brick veneer; asphalt composition shingle roof; pine floors; cost \$3500. (Lately noted.)

Ga., Savannah.—W. S. Daffin let contract to F. McRae, Savannah, to repair and remodel residences at 202-04 E. Huntington St.

Ga., Savannah.—Dr. Julian F. Chisholm let contract to F. McRae, Savannah, to erect \$5000 addition to residence at Vernon View.

Ga., Savannah.—Grant I. Taggart let contract to Olaf Otto, Savannah, to erect \$50,000 residence.

Ga., Savannah.—Savannah Sugar Refinery Corporation let contract to Artley Company, Savannah, to erect 25 dwellings; 2 and 4 rooms each; construction begun.

Miss., Corinth.—J. A. McAmis let contract to A. H. Patrick, Corinth, to erect residence; 1 story; 44x62 ft.; asphalt shingle roof; moist-air heat; tile bath; hardwood floors; electric fixtures; cost \$5000.

Miss., Jackson.—J. N. Flower let contract to J. N. Varley, Jackson, to erect residence; steam heat; cost \$15,000; N. W. Overstreet, Archt., Jackson, Miss.; construction begun.

N. C., Charlotte.—John B. Oates, 235 S. Tryon St., let contract to Carolina Realty Co., Charlotte, to erect residence; 8 rooms; frame and brick veneer; slate roof; hot-air heat. (Lately noted.)

Okla., Tulsa.—C. R. Walts, Box 623, Tulsa, let contract to Laird & Hungerford, Tulsa, to erect bungalow; 28x33 ft.; frame; shingle roof; wood floors; cost \$3000. (Lately noted.)

Tenn., Memphis.—Abe Lewis, 90 N. Main St., let contract to Ozane & McKnight, Scimitar Bldg., Memphis, to erect residence; 2 stories; brick veneer; tile roof; hardwood floors; cost \$5000; hot-water heat, \$1000. (Lately noted.)

Tenn., Memphis.—J. J. Ginsberg let contract to McHugh & Lester, Schultar Bldg., Memphis, to erect residence; 2 stories; brick veneer; tile roof; hardwood floors; cost \$8000; hot-water heat, \$1000. (Lately noted.)

Tex., Houston.—L. L. Pugh let contract to R. L. Walde, Houston, to erect 2-story frame residence; cost \$4250.

Tex., Houston.—W. D. Smith let contract to T. N. McMillan, Houston, to erect 2 dwellings; cost \$2198 and \$2630.

Tex., Houston.—Mrs. L. Bush let contract to H. L. Weinberg, Houston, to erect 6-room residence; cost \$2600.

Tex., San Antonio.—Ed. Cotulla let contract to John Hagy, San Antonio, to erect residence; 30x13 ft.; frame; shingle roof; lumber floors; cost \$3100. (Lately noted.)

Tex., Wichita Falls.—C. W. Reid, Pres. of National Bank of Commerce, let contract to Taylor Bros., Wichita Falls, to erect residence; 2 stories; mission type; 10 rooms and basement; outer walls interlocking tile; stucco finish; cement porch floors; tile floors and wainscoting in bathrooms; composition shingle roof; cost \$415,000; Sanguinet, Staats & Pate, Architects, 507 Kemp & Kell Bldg., Wichita Falls.

Va., Newport News.—United States Shipping Board, Emergency Fleet Corp., J. Rogers Flannery, Director of Housing, 1319 F St., Washington, D. C., let contract, it is reported, to Mellon-Stuart Co., Pittsburgh, Pa., to erect dwellings, churches, school, business buildings, etc., at Hilton, near Newport News.

W. Va., Charleston.—G. W. Moore, J. W. Cart, Will H. White let contract to Melton & Chapman, Charleston, to erect residences; 2 stories; two 42x31 ft., three 22x26 ft., one 24x28 ft. and one 25x34 ft.; brick and frame construction; composition shingle and cedar shingle roofs; oak and pine floors; natural gas heat; city electric lights; cost \$19,639; E. L. Chapman, 416 Humphreys Court, and H. Rus Warne, Architects, both of Charleston. Address Jas. E. Melton, Station B, Charleston. (Lately noted.)

W. Va., Moundsville.—D. E. Schildts is reported to have let contract to S. W. O'Neil & Son to erect bungalow; 28x30 ft.

GOVERNMENT AND STATE

S. C., Charleston.—Remount Station.—War Dept., Washington, D. C., let contract to erect buildings for remount station in North Charleston to include barracks, feed storehouse, corral, etc.

Va., Newport News.—Barracks.—War Dept., Washington, D. C., let contract to Winston & Co., Richmond, to erect barracks at Lee Hall to accommodate 30,000 men.

HOSPITALS, SANITARIUMS, ETC.

Ala., Birmingham.—South Highland Infirmary let contract to Evans Bros. Construction Co., Birmingham, to erect hospital building; 40x60 ft.; 3 stories and basement; brick walls; wood floors; slate roof; vapor heat; cost \$20,000; King & Burnham, Architects, Jefferson County Bank Bldg., Birmingham. (Lately noted.)

Ga., Waycross.—Drs. J. H. Latimer, A. Fleming, H. J. Carswell and others let contract to remodel residence for hospital. (Lately noted.)

W. Va., Charleston.—Charleston General Hospital has plans by and let contract to W. A. & J. A. Abbott, 12 Columbia Blvd., Charleston, to improve hospital building; frame; patent shingle roof; hard pine floors; steam heat; electric lights; cost \$6000.

HOTELS

Fla., Clearwater.—Bellevue Hotel let contract to G. A. Miller, Tampa and Clearwater, to erect swimming-pool building and pool; building 107x129 ft.; brick; stuccoed on outside with white cement; interior, concrete lined with tile; second floor for dance hall; ground floor, offices and stores; laundry, drying-rooms and Turkish baths in basement; pool 60x75 ft.; observation seats in tiers extending around 3 sides and overlooking pool; pool equipped with chute, spring-board, etc.; surrounding pool on 4 sides will be walkway, along which will be 104 dressing-rooms; cost \$75,000.

Ga., Porterdale.—Bibb Mfg. Co., let contract to West Point Iron Works, West Point, Ga., to erect hotel, natatorium and laundry; brick; natatorium to contain pool 40x60 ft. with tile setting; L. W. Robert & Co., Architects, Candler Bldg., Atlanta.

W. Va., Mullens.—D. J. Phipps, Roanoke, Va., general contractor to erect hotel and

bank building for Bank of Wyoming. let sub-contracts in connection therewith; brick, steel, limestone and cement; Barrett specification roof; wood floors; steam heat; electric lights and elevators; cost \$147,000; G. R. Ragan, Archt., Roanoke. (See Bank and Office.)

MISCELLANEOUS

D. C., Washington.—Restaurant.—Globe Restaurant Co. let contract to Arthur M. Poynton, 715 Fourteenth St., Washington, to remodel building at 131 E St. N. W.; 23x100 ft.; brick walls; wood joist; tin roof; tile floors; city lighting; cost \$6200; hot-water heat, \$600.

Fla., Clearwater.—Swimming Pool.—Bellevue Hotel let contract to G. A. Miller, Tampa and Clearwater, to erect swimming-pool building and pool; building 107x129 ft.; brick; stuccoed on outside with white cement; interior, concrete lined with tile. (See Hotels.)

Md., Baltimore.—Home.—Home for the Friendless, Mary Kilroy, Supt., let contract to B. F. Bennett Building Co., 123 S. Howard St., Baltimore, to erect home to replace structure recently burned at Druid Hill and Lafayette Aves.; cost \$5000.

Md., Baltimore.—Restaurant.—Childs' Dining Hall Co., Harry M. Cannon, Mgr., 20 N. Charles St., let contract to R. H. Frazier & Son, 224 W. Mulberry St., Baltimore, for alterations to property at 9 W. Fayette St.

Md., Frederick.—Barn.—Patterson Bros. let contract to rebuild barn to replace burned structure.

Tenn., Bristol.—Barn.—W. C. Godsey let contract to Godsey-Moore Lumber Co., Bristol, to erect barn 4 mi. south of Bristol, to replace structure lately noted damaged by fire; 52x64 ft.; wood frame; galvanized iron roof; concrete floors; electric lights from farm plant; cost \$2000. (Previously noted.)

RAILWAY STATIONS, SHEDS, ETC.

Fla., Lakeland.—Atlantic Coast Line R. R., J. R. Willoughby, Ch. Engr., Wilmington, N. C., let contract to H. E. Hall to erect passenger station to replace structure previously noted damaged by fire; 2 stories; steam heat; cost \$40,000. (Previously noted to repair building.)

SCHOOLS

Ark., Conway.—Hendrix College Trustees let contract to W. R. Stuck, Jonesboro, Ark., to erect first story of 100-room dormitory; cost \$10,000.

Ark., Little Rock.—School Board let contract at \$128,000 to H. F. Ault, Little Rock, to erect grade and junior high school in 60x200 ft.; fireproof; brick walls with reinforced floor slabs and roof; Barrett specification roofing; wood and tile flooring on concrete; heating and lighting not decided; Chas. L. Thompson and Thos. Harding, Architects, 504 Southern Trust Bldg., Little Rock. (Lately noted.)

Miss., Moselle.—School Supervisors let contract to Massengale & McIntosh, Hattiesburg, Miss., to erect school; 50x70 ft., brick; asphalt shingle roof; yellow pine floors; cost \$8000. N. W. Overstreet, Archt., Jackson, Miss. (Lately noted.)

Miss., Tchula.—City has plans by N. W. Overstreet, Jackson, Miss., for school building and let contract to Leake & Goodlett, Tupelo, Miss.; brick; asphalt shingle roof; hot air heat; cost \$15,000.

N. C., Marshall.—Madison County Board of Education let contract to C. J. Ebs, Marshall, to erect school; 10 rooms and auditorium; concrete blocks; vulcanite shingle roof; cost \$15,000; Smith & Carrier, Architects, Asheville. Address contractor. (Lately noted.)

Tex., Dallas.—School Board of Lisbon Dist. let contract to W. J. Galley, Gen. Delivery, Oak Cliff, Tex., to erect school building; 2 stories and substory; brick and mill construction; tar and gravel roof; wood joist floor construction; jacketed room heaters; knob and tube lighting system; cost \$18,000; C. H. Leimbach, Archt., 1105 Southwestern Life Bldg., Dallas. Address Contractor. (Previously noted.)

Tex., Houston.—J. L. Dickens let contract to M. J. Bass, Houston, to erect Bible Institute building; 2 stories; hollow tile; cost \$6000.

Va., Newport News.—United States Shipping Board let contract, it is reported, to Mellon-Stuart Co., Pittsburgh, Pa., to erect schools, dwellings, business buildings, etc., at Hilton. (See Dwellings.)

STORES

Fla., Clearwater.—Bellevue Hotel let contract to erect building to contain swimming pool, etc.; offices and stores on ground floor. (See Hotels.)

Ga., Columbus.—Mrs. Alice Knuckles has plans by T. W. Smith and let contract to M. C. Barlow, both of Columbus, to remodel store for Du Pont Kirven; install new equipment; electric lift and elevators; hot-air heat ventilating system; enlarge basement; cost \$10,000; also has plans by and let contract to same architects and contractor to remodel store for Humes Music Co.; cost \$7000. (Humes Music Co. lately noted to remodel building.)

Ga., Savannah.—W. R. Morrison has plans by and let contract to W. A. Chaffee, Savannah, to remodel building at Broughton and Montgomery Sts. for 3 stores; 60x90 ft.; 3 stories and basement; new plate-glass front; tile vestibules; partitions; install electricity and plumbing; cost \$2500. (Lately noted.)

La., Lake Charles.—Saml. Kaufman let contract to P. Oliver & Son, Lake Charles, to erect business building; 50x100 ft.; 3 stories; brick; Johns-Manville roof; concrete floors; city electric and gas lighting; electric elevators; cost \$15,000; E. W. Phillips, Archt., Lake Charles. (Lately noted.)

Miss., Laurel.—D. A. Matison let contract to remodel store on Central Ave.; double capacity by removing adjoining wall; mezzanine floor around entire building; new fixtures, etc.

Mo., St. Joseph.—Lawhon-Stamey Construction Co., St. Joseph, general contractor to erect Leader Building for Dr. Jacob Geiger, let following sub-contracts: Elevators, American Elevator & Machine Co., Louisville, Ky.; plumbing and heating, C. L. Kenney; finish hardware, Curtin & Clark; toilet partitions, metal windows and metal doors, Mannan & Smith; face brick, St. Joe Pressed Brick Co.; cement, Dougherty & Moss; excavation, Land Concrete Co.; millwork, L. H. Batsell & Sons; electrical work, Columbia Electric Co.; structural steel, St. Joe Structural Steel Co.; all of St. Joseph; reinforcing steel, Truscon Steel Co., Youngstown, Ohio; cut stone, Matthews Bros. Co., Bloomington, Ind.; terra-cotta, Western Terra-Cotta Co., Kansas City, Kan.; plans by Walter Boschen, St. Joseph, call for 5-story structure; 107x122 ft.; reinforced concrete; pitch and gravel roof; reinforced concrete floors; steam heat; electric lights; prism-glass vault lights; electric elevators; cost \$150,000. (Previously noted.)

Mo., St. Louis.—St. Louis County Producers' Market Co., Sarah St. and Laclede Ave., let contract to Martin J. Bartels, 4224 Bingham Ave., St. Louis, to erect building; 50x200 ft.; 9 stories; brick; gravel roof; wood floors; city lighting; cost \$20,000; 10 hand-power elevators to cost \$300 each; Oliver J. Popp, Archt., Odd Fellows' Bldg., St. Louis. Address owner. (Lately noted.)

N. C., Durham.—J. S. Hill let contract to I. G. Lawrence, Durham, to remodel Ellicott Bldg. on Main St. (Lately noted.)

S. C., Florence.—E. M. Matthews Co., Inc., J. L. Freidheim, Pres.-Gen. Mgr., let contract to Haynesworth & Lawton, Florence, to rebuild old Florence Iron Works building for drug store, offices, display-rooms, laboratories and warehouse 54x150 ft.; 2 stories; pressed brick, cement and steel.

Tex., Italy.—City let contract at \$15,900 to C. G. Edwards, Longview, Tex., to erect school; 2 stories; brick; composition roof; first floor concrete under wood; second floor wood; stores; T. J. & J. O. Galbraith, Architects, Slaughter Bldg., Dallas, and Elks' Bldg., Hillsboro, Tex. (Lately noted.)

MACHINERY, PROPOSALS AND SUPPLIES WANTED

Manufacturers and others in need of machinery or supplies of any kind are requested to consult our advertising columns, and if they cannot find just what they wish, if they will send us particulars as to the kind of machinery or supplies needed we will make their wants known free of cost, and in this way secure the attention of manufacturers and dealers throughout the country. The Manufacturers Record has received during the week the following particulars as to machinery and supplies wanted.

"WANTS"

Bank Fixtures.—Peoples' Bank & Trust Co., A. H. Dobbs, Pres., Reform, Ala.—Prices on safe, vault and other bank fixtures.

Boiler.—See Canning Machinery, etc.—Kogge Canning Co.

Boiler.—Liberty Canning Co., M. C. Bree-

Tex., Orange.—Geo. E. Holland let contract to J. M. Pearson, Box 384, Orange, to erect store and moving picture theater building; brick and tile; 80x150 ft.; 2 stories and basement; first floor concrete; upper floor wood; wood studs and metal lath and plaster; tar and gravel roof; Babin & Beck, Architects, Beaumont. (Lately noted.)

Tex., San Antonio.—J. P. Haynes, San Antonio, general contractor to erect store building for H. P. Burns, let following sub-contracts: Tile and marble, F. Redondo; metal lath and sidewalk lath, A. Salisbury; electric work, Martin Wright; roofing, Turner Roofing Co.; millwork, Steves Sash & Door Co.; reinforcing steel and ornamental iron, Alamo Iron Works; plastering, John Healy; painting, Doyle Decorating Co.; plumbing and heating, West & Gutzelt; sheet-metal work, Glass & Tinsch; finishing hardware, Sam Spier; cement, San Antonio Portland Cement Co.; crushed stone, Cholo Gravel Co.; sand, Geo. T. Jambers; all of San Antonio; terra-cotta, Atlantic Terra-Cotta Co.; sprinkler system, Automatic Sprinkler Co.; metal doors and windows, Gilbert Mfg. Co.; all of Dallas; glazing, Pittsburgh Plate Glass Co., Pittsburgh, Pa.; elevators, Otis Elevator Co., New York; sidewalk elevator, A. G. Speidel, Reading, Pa.; plans by Sanguinet & Staats, Fort Worth, call for 3-story and basement structure; 55x150 ft.; concrete; tar and gravel roof; wood on concrete floors; cost \$15,000. (Previously noted.)

Va., Newport News.—United States Shipping Board let contract, it is reported, to Mellon-Stuart Co., Pittsburgh, Pa., to erect business buildings, dwellings, etc., at Hilton. (See Dwellings.)

W. Va., Kimball.—King Coal Co. let contract to H. A. Lucas, Kimball, to erect commissary; 60x120 ft.; metal ceiling; composition roof; wood and tile floors; cost \$12,000; hot-water heat, \$200. Address Contractor.

THEATERS

Ala., Birmingham.—City Comsn. let contract to Jas. L. Carey, Birmingham, to erect open-air theater; seating capacity 7000; walls built in form of trusses; cost \$2750; Wm. L. Welton, Archt., Birmingham. (Lately noted.)

Tex., Orange.—J. S. Merriweather, Orange, has contract to erect theater; brick veneer; W. R. Griffin, Archt., Orange.

Tex., Orange.—Geo. E. Holland let contract to J. M. Pearson, Box 384, Orange, to erect picture show and store building; 2 stories and basement; brick and tile; tar and gravel roof; concrete and wood floors; Babin & Beck, Architects, Beaumont. (See Stores.)

WAREHOUSES

Md., Baltimore.—Mount Vernon-Woodberry Mills, Inc., let contract to Cogswell-Koether Co., 406 Park Ave., Baltimore, to erect 6-story concrete warehouse at Woodberry; cost \$50,000; Joseph Evans Sperry, Archt., 409 Calvert Bldg., Baltimore. (Lately noted.)

S. C., Florence.—E. M. Matthews Co., Inc., let contract to Haynesworth & Lawton, Florence, to rebuild old Florence Iron Works building for drug store, warehouse, etc. (See Stores.)

S. C., Nichols.—Planters' Warehouse Inc'd. with \$15,000 capital; E. M. Menes, Pres.; H. Hinson, V.P.; A. D. Jackson, Secy.; J. R. Battle, Treas.; let contract to G. M. McKay, Nichols, to erect warehouse 100x200 ft.; brick; tin roof; wood floors; cost about \$15,000. Address owner.

Va., Richmond.—T. W. Wood & Sons will rebuild warehouses Nos. 11, 12, 13, 15, 17; cost \$200 to \$300; J. T. Nuckols & Co., Contractors, Richmond.

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Boiler (Tubular).—Purdy Bros., Lucasville, O.—Prices on 70 to 80 H. P. tubular boiler; stand 100 to 110 lbs. test in Ohio. (See Engine and Boiler.)

Boilers.—John G. Duncan Co., 308 W. Jackson Ave., Knoxville, Tenn.—Prices on vertical boilers. (See Engines (Hoisting) and Boilers.)

Boats.—J. W. Hoopes, Denbigh, Va.—Prices on gasoline or producer gas tugboat; also 2 or 4 lighters, 150 tons; may consider small steam tug.

Box Machinery.—Santee Mfg. Co., Eutawville, S. C.—Prices on box machinery: Double surfacer; cut-off and rip tables; equalizer; hopper feed resaw; boiler and engine. State condition and how long used.

Brick Machinery.—Peter E. Bartlett, Box 157, Miami, Fla.—Data on establishment of (clay) brick-manufacturing plant and prices on second-hand machinery.

Bridge Construction.—See Road and Bridge Construction. — Harris County Comms.

Bridge Construction.—Tucker County Comms., H. F. Colebank, Clerk of Court, Parsons, W. Va.—Bids until May 7 to construct bridge over Roaring Run, between Parsons and Hambleton; 54-ft. span; steel girder construction; county to furnish girders.

Bridge Construction.—Santa Rosa County Comms., H. W. Thompson, Clerk Circuit Court, Milton, Fla.—Let contract May 14 to construct bridge across Blackwater River, at Milton; plans and specifications on file at clerk's office, Milton, or office of State Road Dept., Tallahassee, Fla.

Bridge Construction.—City of Bradenton, Fla., Harry Wadham, Commr. Public Works, and City of Palmetto, Fla., L. G. Wingate, Commr. Public Works.—Bids until May 14 to construct bridge across Manatee River, according to plans and specifications on file City Clerk's office, each city; wood structure, 1 mi. long, with 2-leaf bascule steel draw span with 75-ft. openings; width 18 ft.; L. L. Hine, City Clerk, Bradenton.

Building Materials.—See Compressor (Air), etc.—C. D. Mitchell.

Building Materials.—J. R. Owen, Randleman, N. C.—Prices (freight allowed to Asheville, N. C.) on hollow tile for furring and partitions, wall tile from 3 to 10 in., slate and asbestos, cement slate roofing, cement and lime; for County Home.

Canning Machinery, etc.—Kogge Canning Co., R. No. 3, Tampa, Fla.—Prices on kraut cutter (hand and power); small boiler; steel cap machine (power); sanitary capping machine; peanut butter machinery; general canning supplies.

Car.—Levering & Levering, Baltimore, Md.—Prices on 2-yd. self-tripping car; 24-in. gauge preferred.

Cars (Dump).—L. F. Hobbs, Box 483, Norfolk, Va.—Prices on 20 1½-yd. steel dump cars. (See Railway Contractors' Equipment, etc.)

Cars (Dump).—J. W. Hoopes, Denbigh, Va.—Prices on dump cars.

Cars.—See Mining Machinery (Coal). — Cover Coal Co., Piedmont, W. Va.—Prices on mine cars.

Cement and Lime.—J. R. Owen, Randleman, N. C.—Prices (freight allowed to Asheville, N. C.) on cement and lime for County Home.

Channel Construction, etc.—Lake Worth Inlet Dist. Comms., E. E. Geer, Secy., West Palm Beach, Fla.—Bids until Apr. 30 to construct inlet cut, approach channel and turning-basin (inside work) and outside approach channel and jetties, all as contract No. 1; also construct crescented wood wharf, contract No. 2; contract No. 1 involves 248,683 cu. yds. earth, 39,830 cu. yds. rock, 5246 cu. yds. jetty hearting and 3268 tons jetty capping; contract No. 2 involves 780 front feet crescented dock and 1200 front feet crescented bulkhead; specifications and plans obtainable from Isham, Randolph & Co., Ch. Engrs., Barnett Bldg., Jacksonville, Fla.

Compressor (Air), etc.—C. D. Mitchell, Supt. State Insane Hospital, Jackson, Miss. Bids until April 30 for air compressor, hot-water heater, water tube boiler, 2 to 8-in. steam pipe, fittings and valves, reducing valves, pipe machine threading from 1¼ to 6 in., boiler feed pump, fire and common brick, cement, gravel, lumber, relaying rails, crossties, switch points, etc.; all prices on delivery Jackson; for further information address Jos. McDonnell, Const. Engr., Fondren, Miss., care of State Insane Hospital.

Concrete Tank.—St. Lucie County Commissioners, C. H. Edwards, Chrmn., Fort Pierce, Fla.—Bids until May 7 to construct concrete asphalt tank of 30,000 gals. capacity; plans and specifications on file with Clerk Circuit Court.

Concrete.—Climber Motor Corp., C. E. F. Harris, Mgr., Poteau, Okla.—Concrete for 4 buildings; 270x100 and 300x100 ft.

Conveyor.—H. T. Barnham, 509 Chamber of Commerce Bldg., Richmond, Va.—Batch conveyor for glass factory.

Cotton Cloth, etc.—J. A. Quilty & Son, Li 39 Roches St., Limerick, Ireland.—To correspond with manufacturers of upholstery fabrics; oils; gasoline; paraffin; glucose; boots.

Culvert Pipe.—See Road Construction.—Attala County Highway Comms.

Drainage Construction.—Drainage Dist. No. 26 of Livingston County, Chillicothe, Mo.—Bids until May 15 to construct drainage canal; 1100 ft. long; 6 ft. wide on bottom; 12,000 cu. yds. excavation; bids received at County Courtroom, Courthouse; Fred H. Harris, Clerk County Court.

Drainage Construction.—Comms. Black Bayou Drainage Dist. of Washington County, O. C. Kulicka, Secy., Greenville, Miss.—Bids until May 13 to clear about 700 acres in natural channels; information on request; Morgan Engineering Co., Engr., Memphis, Tenn.

Drainage System.—Directors Drainage Dist. No. 17, Mississippi County, J. L. Russell, Secy., Blytheville, Ark.—Bids until May 9 to construct drainage canals and levees; estimated cost of earthwork, \$1,350,000; maps, profiles and specifications obtainable from Pride & Fairley, Engrs., Blytheville.

Drills (Electric).—Cook Stone Co., Hopkinsville, Ky.—Prices on electric drills.

Electric Fixtures.—See Plumbing Fixtures, etc.—Monkton Roller Mills.

Electric Materials.—South Florida Farms Co., Clarence M. Busch, Prest., Moore Haven, Fla.—Prices on plumbing and electric material for 2 hotels to cost \$40,000.

Electrical Equipment.—Jesse Straten, Otterville, Mo.—Prices on wire for electric-light plant, also house fixtures and (used) D. C., 5-ampere, 110-volt meters.

Elevator.—Baltimore (Md.) Board of Awards, City Hall.—Bids until May 1 for elevator for Courthouse; specifications and drawings on file with C. H. Osborne, Inspector of Buildings.

Engine.—Cover Coal Co., Piedmont, W. Va.—Prices on engine. (See Mining Machinery.)

Engine.—Santee Mfg. Co., Eutawville, S. C.—Prices on engines. (See Box Machinery.)

Engine.—Mallory Machinery Corp., Baltimore, Md.—300 H. P. Corliss engine; used engine preferred; must be in first-class condition.

Engine and Boiler.—Purdy Bros., Lucasville, O.—Prices on 75 H. P. second-hand side-crank automatic Skinner engine or center crank; also 70 to 80 H. P. tubular boiler, to stand 100 to 110 lbs. test in Ohio.

Engines (Hoisting) and Boilers.—John G. Duncan Co., 308 W. Jackson Ave., Knoxville, Tenn.—Jobbers' prices on double-cylinder, double-drum hoisting engines and vertical boilers from 6x10 up to 8¼x10, with sliding attachments or attachments for handling derricks; first-class condition; for immediate shipment.

Fuel Oil Station.—Bureau of Yards and Docks, C. W. Parks, Chief Navy Dept., Washington, D. C.—Bids until April 29 to construct reinforced concrete reservoirs, each 163 ft. sq. and 22 ft. deep, pump wells and miscellaneous metal work at Fuel Oil Station, Yorktown, Va.; drawings and specification No. 2983 obtainable from Bureau or Commandant of Navy-yard or naval station named.

Glass Factory Equipment.—See Mixing Machinery.—H. T. Barnham.

Graphite.—J. J. Matthews, Guntersville, Ala.—Correspondence with producers of graphite; view to representing; especially interested in graphite for lubrication, etc.

Houses (Portable or Knock-down).—Monkton Roller Mills, 417 Equitable Bldg., Baltimore, Md.—Prices on 18-ready-cut houses, bungalow type; 4 to 5 rooms and bath; for erection at Monkton, Md.

Hydraulic Jacks, etc.—I. S. Mumford, Ocean City, Md.—Prices on hydraulic jacks or other lifting devices for house moving; or will contract for this work.

Kegs (Wooden).—United Dealers' Buying Co., Norfolk, Va.—Prices on wooden kegs, 5 and 10 gals. capacity, earload lots; manufacturers in vicinity of Baltimore preferred.

Kraut Cutters.—Kogge Canning Co., R. No. 3, Tampa, Fla.—Prices on kraut cutters (hand and power). (See Canning Machinery, etc.)

Levee Construction.—Levee Board, T. G. Dabney, Ch. Engr., Clarksdale, Miss.—Bids until Apr. 30 to construct additional levees; 2,650,000 cu. yds.; bidders invited to visit office and examine right of way sheets for information as to character of work, etc.

Lighting Systems.—Virginia Equipment & Supply Co., Richmond, Va.—Addresses of manufacturers of suburban lighting systems.

Lighting System (Isolated).—See Water and Light System.—M. H. Hightower.

Locomotives.—Cook-Stone Co., Hopkinsville, Ky.—Prices on two 30 or 40-ton locomotives.

Locomotives (Oil or Gasoline).—L. F. Hobbs, Box 483, Norfolk, Va.—Prices on two 5-ton oil or gasoline locomotives. (See Railway Contractors' Equipment, etc.)

Lumber.—D. E. Lord, 511 Grove Ave., Petersburg, Va.—Prices on following woods: Silver spruce; mountain spruce; Canadian spruce; white ash.

Machine Shop Equipment.—M. E. Davis, 50 Church St., New York.—Data and prices on equipment for small machine shop for overhauling locomotives, dump cars and steam shovels.

Manganese.—J. J. Matthews, Guntersville, Ala.—Correspondence with producers of manganese; view to representation.

Mica Machinery.—W. J. Beggs & Son, Gadsden, Ala.—Data on development of mica deposits and manufacture of mica products, with prices on machinery.

Mining Machinery (Coal).—Cover Coal Co., Piedmont, W. Va.—Prices on complete mining equipment, including cars, steel rails, fan and engine.

Mixers (Concrete).—L. F. Hobbs, Box 483, Norfolk, Va.—Prices on 4 concrete mixers, ¾-yd. batch, steam or gasoline. (See Railway Contractors' Equipment, etc.)

Mixing Machinery.—H. T. Barnham, 509 Chamber of Commerce Bldg., Richmond, Va.—Prices on batch-mixing machinery for glass factory; also batch conveyor, weighing devices, etc.

Peanut Butter Machinery.—Kogge Canning Co., R. No. 3, Tampa, Fla.—Prices on peanut grinders and butter mill. (See Canning Machinery, etc.)

Pipe (Cast-iron).—Columbus Bierce, care the Churchill Compresses, Union and Planters' Bank Bldg., Memphis, Tenn.—Prices on 20 tons 6-in. and 5 tons 4-in. cast-iron pipe; second-hand; to pass inspection for 80 lbs. pressure.

Pipe (Copper).—Chas. H. Foil, Concord, N. C.—Correspondence with handlers of 1-inch copper piping about 12 ft. long.

Plumbing.—South Florida Farms Co., Clarence M. Busch, Prest., Moore Haven, Fla.—Prices on plumbing and electric material for 2 hotels to cost \$40,000.

Plumbing Fixtures, etc.—Monkton Roller Mills, 417 Equitable Bldg., Baltimore, Md.—Prices on plumbing and electric fixtures, etc., for 18 ready-cut houses; to be erected at Monkton, Md.

Pump.—See Compressor (Air), etc.—C. D. Mitchell.

Rails.—See Compressor (Air), etc.—C. D. Mitchell.

Rails.—Cover Coal Co., Piedmont, W. Va.—Prices on steel rails. (See Mining Machinery.)

Roofing.—J. R. Owen, Randleman, N. C.—Prices (freight allowed to Asheville, N. C.) on slate and asbestos cement slate roofing for County Home.

Railway Contractors' Equipment, etc.—L. F. Hobbs, Box 483, Norfolk, Va.—Prices on following equipment, in first-class second-hand condition, for immediate shipment: 4 concrete elevating buckets, ¾-yd. capacity; 4 tower hoppers, ¾ to 1-yd. capacity; 800 ft. concrete chuting; 4 concrete mixers, ¾-yd. batch, steam or gasoline; 2 traction steam shovels, ¾ dippers, full circle swing; 2 1½-yd. steel dump cars; two 5-ton. oil or gasoline locomotives; 1800 ft. portable track; ¾ switches.

Road Construction.—Virginia State Highway Comsn., at office of Fairfax County Clerk, Fairfax, Va.—Bids until May 6 to construct not more than 5 or less than 3 mi. State roads from Fairfax toward Chan-

illy; plans and specifications obtainable from G. P. Coleman, State Highway Commr., Richmond, Va.; plans may be seen at office of County Clerk, Fairfax, and office of Highway Commr., Richmond.

Road Construction.—Virginia State Highway Comsn., office of F. A. Davis, U. S. Highway Engr., County Courthouse, Charlottesville, Va.—Bids until May 7 to construct 3.16 mi. State highway system, Route 9, between Mechum River and Ivy; alternate bids; plans may be seen at office of F. A. Davis, U. S. Highway Engr., Charlottesville, Va., or office of G. P. Coleman, State Highway Commr., Richmond, and specifications obtainable from latter for \$3.

Road Construction.—Directors Center Township of Vernon County, Nevada, Mo.—Bids until May 7 to improve State road, Project No. 17.3; 0½ mi. grading and surfacing Joplin Chats, 16 ft. wide; includes culverts and other incidental work; plans and specifications on file with W. H. Wood, Engr., Courthouse, Nevada, and with State Highway Dept., Jefferson City, Mo.

Road Construction.—Attala County Highway Comms., C. G. Faucher, Chrmn., Road Dist. No. 1, of Supervisors' Dist. No. 2, Kosciusko, Miss.—Bids until May 6 at office of B. W. Jordan, Chancery Clerk, to construct 20 mi. sand-clay road; also bids on culvert pipe; Engr., M. D. Smith, Kosciusko.

Road Construction.—Escambia County Comms., J. Geo. White, Chrmn., Pensacola, Fla.—Bids until May 14 to construct concrete road from county bridge at Bayou Chico to U. S. Government bridge across Bayou Grande; plans and specifications on file with Jas. McGibbon, Clerk Circuit Court.

Road Construction.—Montgomery County Comms., Berry E. Clark, Rockville, Md.—Bids until May 7 to construct 1½ mi. State-aid highway upon or along street connecting Norbeck State Rd. with Frederick and Darnestown Rds., at town limits of Rockville; 21,000 sq. yds. concrete; bids to be made on blank forms, obtainable from State Roads Comsn., Garrett Bldg., Baltimore; plans can be seen and forms of specifications and contract obtained from State Roads Comsn.

Road Construction.—Delaware State Highway Dept., Geo. W. Francis, Secy., Dover, Del.—Bids until May 15 to construct roads: Contract No. 1, Kent County, 4.05 mi. cement concrete roads; Contract No. 2, Kent County, 1.90 mi. cement concrete; Contract No. 3, New Castle County, 2.46 mi. vitrified brick with concrete foundation; Contract No. 4, New Castle County, 3.75 mi. vitrified brick with concrete foundation; Contract No. 5, Sussex County, 6.00 mi. cement concrete; Contract No. 6, Sussex County, 4.90 mi. cement concrete; Contract No. 7, Sussex County, 6.61 mi. cement concrete; Contract No. 8, Sussex County, 6.36 mi. cement concrete; plans and specifications obtainable from department at Dover for \$10; plans, specifications, etc., from Chas. M. Upham, Chief Engr., State Highway Dept., Dover. (Bids previously called for April 15 were rejected.)

Road Construction.—Dept. of Highways, State of Tennessee, J. J. Murray, Secy., Nashville, Tenn.—Bids at City Hall, Tullahoma, Tenn., until May 13 to construct 5.65 mi. State Highway No. 7, between Franklin-Coffee County line near Tullahoma, and Coffee-Moore County line in Coffee County; principal items include: Common excavation, 13,920 cu. yds.; grader work, 1 mi.; water-bound macadam, 8 in. thick, 10 in. in width, 33,848 sq. yds.; overhaul on macadam, 20,565 cu. yds.; furnishing, hauling, laying and back-filling 15-in. corrugated metal pipe or concrete tile, 120 lin. ft.; 20-in. corrugated metal pipe or concrete tile, 280 lin. ft.; Class A concrete, 40 cu. yds.; Class B concrete, 35 cu. yds.; reinforcing steel, furnishing, hauling, bent and in place, 3550 lbs.; plans and specifications on file with Dept. of Highways, Nashville; additional information from A. M. Nelson, State Highway Engr., Nashville.

Road and Bridge Construction.—Harris County Comms., H. L. Washburn, County Auditor, Houston, Tex.—Bids for 2½ mi. surface treatment on Goose Creek Rd. and for construction concrete bridge at Atascocita crossing on San Jacinto River; bids opened Apr. 24.

Safe.—See Bank Fixtures.—Peoples' Bank & Trust Co.

Sawing (Limestone) Machinery, etc.—Peter E. Bartlett, Box 157, Miami, Fla.—Data and prices on limestone machinery; cutting, planing and sawing.

Sawmill Machinery.—McCurrian Timber Co., Garvin, Okla.—Prices on small type

sawmill, band-sawing machines and table planes.

Scales.—H. T. Barnham, 509 Chamber of Commerce Bldg., Roanoke, Va.—Weighing devices for glass factory.

Sewer Construction.—City of Richmond, Va., Chas. E. Bolling, City Engr.—Bids until Apr. 26 to construct additional sewers.

Sewer Construction.—City of Martinsburg, W. Va., T. W. Sparrow, Commr. of Streets. Bids until May 18 to construct 1520 lin. ft. 24-in. sewer in East Brooke St. and Maple Ave.; also catch-basins, manholes, etc.; plans, specifications, etc., on file.

Sewer Construction.—City of Newport News, Va., T. E. Pearce, City Engr.—Bids until Apr. 30 to construct sewers in Marshall Ave. from 29th to 32d St. and in 30th, 31st and 32d Sts. from Marshall to Madison Ave.; plans and specifications on file with City Engr.

Screening and Loading Machinery (Gravel).—Harrison County Supvrs., John J. Murphy, Clerk, Gulfport, Miss.—Bids May 6 to furnish equipment for screening and loading gravel.

Shovels (Steam).—L. F. Hobbs, Box 483, Norfolk, Va.—Prices on 2 traction steam shovels, ½ dippers, full circle swing. (See Railway Contractors' Equipment, etc.)

Shovels (Steam or Gasoline).—J. W. Hoopes, Denbigh, Va.—Prices on 1 or 2 small steam or gasoline shovels; about ¾ or 1 yd.

Shovel (Steam).—Cook Stone Co., Hopkinsville, Ky.—Prices on steam shovel.

Stave and Heading Machinery.—Chas. W. Sneff, Opequon, Va.—Prices on complete equipment for manufacture of sawed barrel staves and heading.

Steel.—Climber Motor Corp., C. E. F. Drake, Mgr., Poteau, Okla.—Steel for four buildings; 300x100 and 270x100 ft.

Tile.—J. B. Owen, Randleman, N. C.—Prices (freight allowed to Asheboro, N. C.) on hollow tile for furring and partitions and wall tile 3 to 10 in. for County Home.

Tower and Tank.—Monkton Roller Mills, 417 Equitable Bldg., Baltimore, Md.—Prices on water tower 65 ft. high, with tank (elevated) and windmill; for installation Monkton, Md.

Trench Excavating Machine (Sewer).—Greenwood Light & Water Co., Roy Stott, Mgr., Greenwood, Miss.—To buy or rent sewer trenching machine, to trench for pipe up to 15 in., and to depth not less than 10 ft.

Transmissions (Variable Speed).—Cotton States Belting & Supply Co., R. E. Rushton, Mgr., Atlanta, Ga.—Addresses of manufacturers of variable speed transmissions.

Tugboats.—See Boats.—J. W. Hoopes.

Tugs and Tug Pans.—Machinery Exchange Co., Bienville and David Sts., 4201, New Orleans, La.—Dealers' prices on 3 tugs, about 1000 H. P. each; accept 750 to 1250 H. P.; also interested in separate parts.

Valves and Castings.—Baltimore (Md.) Board of Awards, City Hall.—Bids until May 1 to furnish to Water Dept. valves and special castings; specifications and proposal forms obtainable from Walter E. Lee, Water Engr., City Hall.

Vault.—See Bank Fixtures.—Peoples' Bank & Trust Co.

Water and Light System.—M. H. Hightower, Hogansville, Ga.—Data and prices on water and light system for country home.

Windmill.—See Tower and Tank.—Monkton Roller Mills.

Water-works.—City of Mineral Wells, Tex., L. E. Cowling, Mayor.—Bids until May 6 to construct water system; include storage reservoir in Rock Creek Valley, consisting of dam containing 104,000 cu. yds. earthwork, material to be secured from excavation for spillway and borrow pits; 10,000 sq. yds. slope protection work; 500 cu. yds. concrete; excavation of rock hill-sides; 200 acres clearing and grubbing; natural rock spillway, etc.; plans, specifications, etc., on file with Wm. W. McClendon, City Engr.

from a cistern and forcing it to any other part of the building, distribution being by means of a connecting pipe at the back end of the pump. This pump has a 6-inch stroke, with screw valve cutoff in the spout and 3-inch brass tube cylinder. It takes the place of the Nos. 13 and 13A Novelty pumps. All pumps of this line, it is stated, are accurately manufactured so that parts ordered for repairs, for instance, will always fit perfectly. The circular is fully illustrated.

Storage Battery Locomotives.

Jeffrey storage battery locomotives are built for heavy service, their frames being made of structural steel, reinforced with cast-steel journal pedestals, this rugged construction being one of their several advantages. These and other facts are presented in Catalogue No. 231 of the Jeffrey Manufacturing Co., Columbus, O., which has just been issued. The locomotives are especially useful for industrial work, safety of operation being a prominent feature. Besides, the flexibility of the track system employed accords a wide range of operation for the engines, which may thus run in and out of buildings; in fact, anywhere around a plant, for overhead wires are not required. The book is finely illustrated with full descriptive matter.

Trade Acceptances in War Work.

An address delivered recently before the Leaf Tobacco Board of Trade of New York by Beverly D. Harris, vice-president of the National City Bank of that city, on the "Trade Acceptance Method in War Financing," has been published in pamphlet form. The increasing favor with which this method of financing is being received in this country promises to make it as popular as it is in the Old World. As Mr. Harris says: "The use of trade acceptances abroad is as old as the hills, and has satisfactorily stood the test of time in banking and open market transactions in the leading European countries where credit standards are on the highest plane." He submits numerous cogent arguments in favor of its extension.

Grinding Wheel Dressers.

"Dressing and truing grinding wheels are not one and the same operation. . . . The great difference between dressing and truing lies in the fact that in the latter operation the object is to dull the fine cutting points of the abrasive grains so as to obtain the requisite finish, while in the former operation the dresser is used to remove the bond from between the abrasive grains, also the dulled grit, leaving in its place sharp grit which will cut freely." With these and other pertinent remarks the Desmond-Stephan Manufacturing Co. of Urbana, Ohio, opens its catalogue, entitled "Grinding Wheel Dressers," and it tells why they should be used, also when and how. Every careful man employing these mechanical appliances will find the book interesting and instructive. The illustrations are excellent.

A Tribute to Patriotism.

With every page enclosed in a border of red, white and blue, a patriotic booklet has been issued by the Lucey Manufacturing Corporation, whose general office is in the Woolworth Bldg., New York, and whose factories are at Chattanooga, Tenn., and Houston, Tex. This is described on the first page as "A slight token of appreciation compiled by the Lucey Manufacturing Corporation for the 'Boys' in the Service and their parents. Its purpose is to encourage the 'Boys', and to spur on the work of those destined to 'Do Their Bit' at home." The names of all of the company's employees who entered the Service are given, and the pictures of a number of them are also displayed. A large illustration in the center of the booklet shows the company's paraders in the Liberty Loan campaign at Houston.

Concerning the Northrop Looms.

No. 184 of "Cotton Chats," issued by the Draper Corporation, Hopedale, Mass., relates particularly to the value of Northrop Looms as compared with ordinary looms. It says "Army uniform goods, blankets, aeroplane cloth, tent cloth, bandage cloths, shirts, surgeon's gauze, and, in fact, practically everything, except ply duck goods, woven on Northrop looms meet the Government requirements as to quality, and in this way bear evidence of the increasing range of fabrics that the Northrop loom will handle, and of the high quality of the product." A full-page picture shows a huge pile of old loom-scrap on the way to the foundry after machines were removed to make way for these improved looms.

Suction Method of Ash Removal.

In its catalogue the Vacuum Ash and Soot Conveyor Co., 2 Rector St., New York, makes the point that its system of ash removal is saving of the tube through which the waste from fires is taken from the furnaces. It says: "We pull, not blow, the ashes through the pipe, and we leave the pipe. By pulling the ashes through by means of suction we prevent the contact of steam and ash in the pipe line, and the result is practically no wear on the conveyor equipment. After a year's test in a large New England plant our system has conveyed over 8000 tons of ashes without any appreciable wear of the pipes." Illustrations and descriptions fully explain the company's system, which is declared to be adaptable to various requirements.

Metal Doors and Shutters, Ventilators, Etc.

A handsomely prepared booklet on the Evans "Almet" fire doors and shutters and the "Star" ventilators has been issued by the Merchant & Evans Company, Philadelphia. These doors and shutters, which are widely approved by underwriters and other officials, are distributed throughout the United States by branch houses and about 250 experienced contracting and erecting licensees, which arrangement enables the manufacturers to give prompt service to architects, builders and owners. It is positively stated that they are lowest in maintenance cost in addition to being thoroughly protective against fire. The ventilators are described as affording the maximum exhaust, keeping the air in motion, expelling the impure air, and distributing the fresh air which takes its place. The booklet is liberally and excellently illustrated. It is important to note that the company for the benefit of the Pacific slope trade, has arranged for a large concern in San Francisco to manufacture the fire doors and shutters, as well as the Star ventilators.

Petroleum and Natural Gas Directory.

The 1917-1918 edition of the Petroleum and Natural Gas Register, published by the Oil Trade Journal, 120 Broadway, New York, has been issued. It is a handsomely prepared volume of about 550 pages, bound in red cloth, with silver lettering, and it contains a directory of the petroleum and natural gas industries in the United States, Canada and Mexico, which includes producers, refiners, compounders, marketers and jobbers of petroleum and its products, casing-head gasoline manufacturers, oil pipe lines, natural gas producers and distributors, geologists, manufacturers and dealers in equipment, and the membership lists of oil and gas associations. A buyer's guide is also published. The publisher says that while no labor or expense has been spared in the preparation of data, it is realized that the first work of this kind cannot be entirely free from inaccuracies and omissions, especially as to the oil business, which has undergone such remarkably active development within the last year. Yet it is believed that it will be realized that this is a book thoroughly representative of the trade and that it contains information heretofore unobtainable in compact form. The pages are large, the paper is heavy and type is large and clear.

A Fine Publication.

A large and handsomely prepared bulletin relating to "Railway Water Supply," has been issued by the Layne & Bowler Company, Memphis, Tenn. "In the earlier days of railroad," says the foreword, "the sole idea of the water department was to get water, and with the traffic and operating conditions then prevailing, water stations could be located at points where a dependable supply was most readily available. Modern operating demands have changed this practice to the extent that water stations must now be located at points most convenient to train movement. This has compelled the abandonment of many old surface supplies and forced a development of ground water by the construction of shallow and deep wells. Decreased rates and increased operating costs have caused American ingenuity to search out methods whereby greater economies could be effected. Thus the development of more efficient pumping machinery has been stimulated, as is represented by the deep-well turbine pump." The bulletin portrays what 26 years of experience of the company has done to meet the requirements of modern railroad. Pumps, screens, etc., are fully described and beautifully illustrated. Pictures of typical installations are also presented. The book is a fine production, like all other literature issued by the same company.

RAILROAD CONSTRUCTION

RAILWAYS

Okla., Pawhuska.—Extension of the Santa Fe System from Caney, Kan., to Cushing, Okla., via Pawhuska, about 85 mi., is reported approved by the Federal Railroad Administration. H. W. Wagner, Topeka, Kan., is Ch. Engr. Eastern Lines.

Va., Bristol.—Boxley & Haley of Roanoke, Va., have, it is announced, been awarded contract to do the grading for the Norfolk & Western Ry.'s yard enlargement in Bristol, the estimated cost of all work proposed, according to the City Council ordinance authorizing it, being about \$169,000. H. N. White of Roanoke is engineer in charge. Local office of contractors, 821 Washington St., Bristol, Va. Considerable additional work is reported in prospect. J. E. Crawford, Roanoke, Va., is Ch. Engr. for the road.

W. Va., Charleston.—Kanawha & Michigan Ry. has started construction of second track between Charleston and Nitro, W. Va., 15 mi., to make the line double tracked. Initial work is from Charleston to West Charleston, 1½ mi. Company forces employed. C. M. McVay, Charleston, is Engr. Maint. of Way.

forces undertake are dredging and filling, land reclamation, canals and port works, river and harbor improvements, deep waterways and ship channels. It also executes contracts for the United States Government. Its plant and other facilities are large.

A New Pressure Governor.

The General Electric Co. has developed a new pressure governor to control standard self-starters for motor operated pumps and compressors. It maintains a pressure between predetermined limits on any gas or liquid systems that will not corrode the Bourdon Tube. This governor is called the CR 2922, and can be used on any standard a. c. or d. c. circuit. It is rated for pressures of from 80 to 500 pounds, and operates within settings of from 3 to 12 pounds between high and low pressures. Governors for higher pressures can be supplied if desired. Action of the governor is dependent on the Bourdon Tube, which should be connected to an independent discharge pipe from the pressure tank. The free end of the tube is mechanically connected to an indicator needle, moving it over the scale as changes of pressure affect the tube. After the settings for the pressure range are made the governor will automatically maintain pressure within those limits.

TRADE LITERATURE

A New Novelty Pump Described.

A circular issued by the Hess-Snyder Company, Massillon, O., describes, among other articles, the No. 130 Novelty pump recently placed on the market and intended to be used inside of a house for pumping water

INDUSTRIAL NEWS OF INTEREST

Elects A New President.

A. Baldwin & Company, Ltd., New Orleans, La., announce the election of G. B. Baldwin to be president succeeding H. F. Baldwin who has resigned from business to take a much-desired and needed rest for the benefit of his health. The new head of the corporation was previously its vice-president.

Obligated to Increase Power Production.

The Logan County Light & Power Co. of Logan, W. Va., has just completed the installation of an additional 5000 K. W. turbine and four 500 H. P. boilers and stokers, but to meet the increased demands for power from various coal mines it has also purchased two additional 500 H. P. water-tube boilers from the Edge Moor Iron Works, Edge Moor, Del.; two 500 H. P. stokers from Detroit Stoker Co., Detroit, Mich., and one 600-gallon turbine-driven, centrifugal, boiler-fed pump from the Worthington Pump & Machinery Corp., New York city. It is also extending its high-tension transmission lines. F. R. Weller, Washington, D. C., is consulting engineer. This company is owned and operated by the General Utilities & Operating Co., J. C. M. Lucas, president, Munsey Bldg., Baltimore, Md.

Changed Southern Office.

The Atlantic, Gulf & Pacific Company has removed its Southern office from Houston, Tex., to Mobile, Ala., where it is now located at 906 Van Antwerp Bldg. The company's business is engineering and contracting, in which lines its reputation is wide and its experiences long. It also has offices at New York city, besides one at Manila in the Philippine Islands. Among the work which its

FINANCIAL NEWS

FINANCIAL CORPORATIONS

Ala., Mobile.—Farmers & Mechanics National Bank of Mobile has made application for charter; capital \$200,000.

Ala., Reform.—People's Bank & Trust Co., capital \$25,000, has made application for charter. A. H. Douns, Pres.; M. I. Harper, V.-P.; J. O. Stopp, Cashier. Business is expected to begin in about 60 or 90 days.

Ark., Clayton.—First State Bank is chartered; capital \$10,000. J. Easton, C. Wason, Antlers, and T. E. Boland, Incprts.

Ark., Des Arc.—First National Bank has made application for charter; capital \$25,000.

Ga., Alma.—Alma State Bank, branch of the Baxley State Bank, Baxley, Ga., began business Apr. 18.

Ga., Hamilton.—Peoples Bank of Hamilton is chartered; capital \$25,000. Incprts.: Dayton Calhoun, E. L. Pearce and W. I. Hudson.

Ga., Savannah.—Progressive Savings & Realty Assn., capital \$500, is incptd. by W. E. Johnson, J. H. Butcher, H. F. Dunn, E. C. French, W. B. Hammond, S. O. Johnson, M. H. French, O. P. Mack, G. S. Merrill and B. S. Winlock.

Ga., Palmetto.—Farmers Bank of Palmetto, capital \$25,000 is incptd. by J. A. Reeves, J. J. McElwainey, H. R. Shell and J. O. Welden.

La., Monroe.—Citizens National Bank, Cor. DeSaird and N. Third St., is chartered; capital \$250,000; surplus \$50,000. C. E. Slagle, Clarks, La., Pres.; O. B. Morton, Monroe, La., Cashier. Business is to begin about Oct. 1, 1918.

Md., Baltimore.—The German Bank of Baltimore City announces that it has changed its name to the Central Bank of Baltimore City. August Weber, Pres.; Geo. F. Lang, Cashier.

Okla., Guthrie.—Guthrie Abstract Co. is chartered; capital \$10,000. Incorporators: R. A. Gaffney, Charles C. Calling and F. L. Williams.

Okla., Mill Creek.—Home State Bank, capital \$15,000 is incptd. by C. H. Rivos, Ada, John Hood, James Lester, Mill Creek.

Okla., Muskogee.—Great Western Life Insurance Co. chartered; capital \$300,000; incorporators, J. R. Hydrick, I. P. Hydrick, I. P. Hydrick, Jr.

S. C., Charleston.—The name of the Germania National to the Atlantic National Bank.

S. C., Charleston.—The Germania Savings Bank has decided to change its name to the Atlantic Savings Bank.

Tenn., Memphis.—Liberty Savings Bank & Trust Co., capital \$100,000, will begin business Apr. 22 at 150 Madison Ave. M. G. Bailey, Pres.; F. L. Monteverde and J. T. Morgan, V.-Ps.; J. R. Buchagnan, Cash. (Recently noted.)

Tex., Dallas.—Southern Mortgage Corp., capital \$100,000, incptd. by C. F. Freeman, E. T. Moore and J. V. Hughes.

Tex., Post.—First State Bank, succeeding the Citizens' Bank, began business April 1; W. O. Stevens, Pres.; J. P. Williams, Cash.; J. P. Newell, Asst. Cash.

Va., Laurel Fork.—Laurel Fork Bank is chartered; capital \$25,000; incorporators, Walter Hyilton, Pres., Meadows of Dan; J. E. Bowman, Secy. and Cash., Laurel Fork.

NEW SECURITIES

Ala., Gadsden.—(Bridge).—\$30,000 of bonds are voted. F. F. Morgan is Clk. Circuit Court.

Ala., Headland.—(Electric, Water).—\$10,000 of bonds to improve electric and water power of the town are voted. Address The Mayor.

Ala., Mobile.—(Road).—Election is to be held in Mobile County to vote on bonds. Address Board of Revenue.

Ala., Town Creek.—(School).—\$5000 of 5 per cent 20-year school building bonds are voted. Address Mayor or City Clk.

Ark., Clarksburg.—(Road).—\$250,000 Road District No. 1, Johnson County, bonds have been purchased by Edgar Hahn, Little Rock.

Ark., Evening Shade.—(Road).—\$45,000 of bonds, Sharpe County Road Dist. No. 1 have been purchased by M. W. Elkins, Sheridan, Ark.

Ark., Little Rock.—(Street).—\$65,000 of bonds Street Improvement Dist. No. 18, have been purchased by the Union Trust Co., Little Rock.

Ark., Yarbrough.—(School).—\$10,000 of bonds have been purchased by James Gould, Pine Bluff.

Fla., Arcadia.—(Road, Bridge).—\$330,000 of bonds, Special Road and Bridge Dist. No. 4, De Soto County, have been purchased at \$316,833 and accrued interest by the United States Trust & Savings Bank, Jacksonville, Fla.

Fla., Daytona.—(City Hall, Fire Station).—Plan to hold election to vote on \$50,000 of bonds is called off. A. Milligan, City Clk.

Fla., De Land.—(School).—Bids will be received until noon May 17 by C. R. M. Sheppard, Supt. of Schools, Volusia County, for \$12,000 of bonds School Dist. No. 41.

Fla., Fort Pierce.—(School).—Bids will be received until 1 P. M. May 4 for \$25,000 of 6 per cent 20-year \$1000 denomination St. Lucie County bonds, dated April 1, 1918, and maturing April 1, 1928, to 1948, inclusive. J. W. Hodge is County Supt.

Fla., Orlando.—(School).—Election is to be held May 11 to vote on \$10,000 of 6 per cent \$250 denomination Apopka School Dist., Orange County, bonds; dated June 1, 1918; maturity June 1, 1919, to June 1, 1933; date for opening bids not yet determined. Address Orange County Board of Public Instruction, A. B. Johnson, Supt.

Fla., Pensacola.—(Road).—Bids will be received until 9 A. M. May 14 by James McGibbon, Clk. Board of Commrs., Escambia County, for \$50,000 of 6 or 6½ per cent 20-year bonds.

Fla., Quincy.—(Bridge).—\$30,000 of 5 per cent 1-17-year \$500 denomination Gadsden County bonds are voted. S. V. Hough is Chmn. Board of County Commrs.

Ga., Carrollton.—(Street).—\$50,000 of 5 per cent bonds have been purchased by Wm. M. Davis & Co., Macon, Ga.

Ky., Louisville.—(Street).—\$10,000 of \$100 denomination bonds voted last Nov.; bonds will probably soon be issued. Augustus Snyder is Mayor.

Ky., Ludlow.—(School).—\$3000 of 5 per cent 20-year \$500 denomination bonds have been purchased at \$3135 by the Farmers & Merchants Bank, Ludlow.

Ky., Versailles.—(Water).—\$20,000 of 5 per cent 10-20-year \$1000 denomination bonds are voted. H. C. Taylor is Mayor.

La., Kinder.—(School).—\$60,000 of Kinder School Dist., Allen Parish, bonds are voted. Address School Board.

La., New Roads.—(Improvement).—Bids will be received until noon April 30 for \$25,000 of 5 per cent public improvement bonds. Joe Lejeune is Mayor.

Md., Brunswick.—(Water).—Election is to be held in August to vote on \$125,000 f bonds. John T. Martin is Mayor.

Md., Easton.—(Water, Street, Light).—Issue of \$196,000 of 4½ per cent and 5 per cent bonds (some to mature in 1920) is authorized. J. B. Clark is Town Clerk.

Md., Mt. Airy.—Issue of bonds is authorized by the Legislature. Address The Mayor.

Miss., Charleston.—(Warrants).—Board of Supervisors, Tallahatchie County, gives notice that it proposes to borrow not more than \$35,000 for the purpose of paying certain expenses of county and to execute loan warrants bearing 6 per cent interest, and payable Jan. 1, 1919. D. S. Henderson is Chief Clerk, and B. C. Henderson, Deputy Clerk.

Miss., Jackson.—(State Bonds).—Bids will be received until 11 A. M. May 10 by Gov. Theodore G. Bilbo for \$3,000,000 of not exceeding 6 per cent State bonds.

Miss., Lexington.—(Refunding).—Notice is given that at the next meeting of Board of Supvrs., Holmes County, May 6, \$6000 of bonds Separate Road Dist. No. 3 will be issued to take up a bond for said amount due May 1, 1918. J. H. Fuqua is Clerk of Board.

Miss., Meridian.—(Road).—\$20,000 of Beat 2, Lauderdale County, bonds are voted. Address Board of Supvrs.

Miss., Quitman.—(School).—Bids will be received on May 6 by W. H. Foster, Clerk Bd. of Supvrs. Clarke County, for \$4500 of Carmichael Consolidated School Dist. bonds.

Miss., Ripley.—(Road).—The Bd. of Supvrs. Tippah County, will, at their June or July, 1918, meeting, sell \$10,000 of 6 per cent bonds 5th Supvrs. Dist. H. A. Crum, Walnut, Miss., Commr. G. O. Duncan is Clerk.

Mo., Clinton.—(School).—\$16,000 of 6 per cent 5-20-year Henry County bonds have been purchased at \$264 premium by W. R. Compton & Co., St. Louis.

Mo., Independence.—(School).—\$7000 of Atherton School Dist., Jackson County, bonds are voted. Address School Board.

Mo., Memphis.—(City).—\$25,000 of 6 per cent city bonds have been purchased at \$115 premium by the Little & Hayes Investment Co., St. Louis.

Mo., Savannah.—(Road).—Election ordered for April 16 to vote on \$1,000,000 of Andrew County bonds was called off. J. J. Miller, County Clerk.

Mo., Van Buren.—(Road).—\$75,000 of 5 per cent 20-year \$1000 denomination Carter County bonds have been purchased by Francis Bros., St. Louis, Mo.

N. C., Albemarle.—(Street).—\$101,000 of 6 per cent 10-20-year \$1000 denomination bonds have been purchased at par and accrued interest by Sidney Spitzer & Co., Toledo, O.

N. C., Asheville.—(Bridge).—\$303,000 of 6 per cent Buncombe County bonds have been purchased at par, accrued interest and \$13,186.80 premium by J. C. Mayer & Co., Cincinnati.

N. C., Goldsboro.—(Water, Sewer, Paving).—Bd. of Aldermen has adopted ordinances authorizing bonds as follows: Extension of water lines, \$35,000; extension of sewers, \$15,000; paving, \$40,000. Edward A. Beck is City Mgr.

N. C., Raleigh.—(School).—State of North Carolina has authorized the issuing of \$500,000 of 4 per cent \$500 and \$1000 denomination bonds for enlarging asylums and institutions of learning. Maturity \$100,000 each year from 1928 to 1932 inclusive. Of the \$500,000 authorized this year \$62,000 have been sold as follows: First National Bank, Rocky Mount, \$10,000; Merchants National Bank, Wilmington, \$13,000; First National Bank, Wilson, \$20,000; First National Bank, Asheville, \$10,000; Peoples Savings Bank, Wilmington, \$9000. The remaining \$438,000 will be sold at private sale. B. R. Lacy is State Treas.

Okla., Ada.—(Road).—Allen and Francis Townships, Pontotoc County, bonds are voted. Address County Commrs.

Okla., Blackwell.—(Light, Fire Equipment).—\$82,000 electric-light plant and \$15,000 fire equipment and station bonds are to be issued. Address The Mayor.

Okla., Demar.—(School).—Election will probably be called to vote on bonds. Address School Board.

Okla., Geary.—(Waterworks).—Bonds are reported voted. Address The Mayor.

Okla., Granite.—(School).—Election will probably be called to vote on bonds. Address School Board.

Okla., Okmulgee.—Bids will be received until 5 P. M. June 3 by R. H. Jenness, Commissioner of Finance, for \$385,000 of water and \$150,000 of sewer 5 per cent 25-year bonds.

Okla., Stillwater.—(School).—\$75,000 of 5 per cent 20-year \$1000 denomination bonds have been purchased by H. Jone, E. W. Hemme, J. P. Hoke and A. Focht, all of Stillwater.

Okla., Westville.—(School).—\$1700 of 5 per cent 20-year high school bonds are voted. Date for opening bids not yet decided. Address Charles Wilson, Director, School Board.

Okla., Wewoka.—(Road, Bridge).—\$160,000 of bonds for roads and bridges are reported voted by townships in Seminole County. Address County Commrs.

Okla., Weleetka.—(School).—Plans are being made to call an election to vote on bonds. Address School Board.

Okla., Yale.—(Waterworks).—Election will probably soon be held to vote on \$300,000 improvement and waterworks bonds. Address The Mayor.

S. C., Charleston.—(Road).—\$275,000 of Charleston County bonds are to be placed on the market. W. Turner Logan is counsel for the County Commrs.

Tenn., Bristol.—(Waterworks Refunding).—Bids will be received until May 21 for \$32,000 of refunding bonds. Address The Mayor.

Tex., Austin.—Bonds approved by Attorney-General: \$12,500 of 5 per cent 10-40-year Stamford Street; \$60,000 of 5½ per cent Wharton County Road Dist. No. 3; \$1400 of 5 per cent 10-20-year Cottle County school-house.

Tex., Bonham.—(Road).—\$70,000 Fannin County bonds are voted. Address County Commissioners.

Tex., Bonham.—(Road).—\$70,000 of bonds Road Dist. No. 23, Fannin County, are voted. Address County Commrs.

Tex., Coleman.—(Road).—\$100,000 of Coleman County bonds are voted. Address County Commrs.

Tex., Corpus Christi.—(Water).—City has voted \$75,000 of promissory notes for improvements to water plant. Address The Mayor.

Tex., Corsicana.—(Water).—\$40,000 of bonds are voted. Address The Mayor.

WAKULLA SPRING, FLORIDA, POSSIBLE POWER SITE

Wakulla Spring, in Wakulla county, Fla., 20 miles southwest of the State capital, Tallahassee, is a phenomenal body of water. It is the source of Wakulla River, which flows 13 miles to the Gulf of Mexico, at St. Marks. The river is about 300 feet in width, near the Spring, and in some places is about a mile wide; it was navigable by boats of 6-foot draught prior to the Civil War, but at that time the harbor at St. Marks was filled with obstructions to prevent the passage of Federal boats, and so remains. With the assistance provided by the Rivers and Harbors bill, this harbor could be restored, and St. Marks made a port. The Seaboard Air Line Railway, which owns the Tallahassee and St. Marks Railroad (the third oldest in the United States), passes within about five miles of Wakulla Spring.

Dr. E. H. Sellards, State Geologist (1917 report), refers to "the great Wakulla Spring," and says: "In the size of the basin and the depth of the water it probably exceeds all other springs in Florida. The spring is the immediate source of Wakulla River, which flows into the Gulf of Mexico. In February and March, 1917, many of the large springs of the State were measured by the State Geological Survey, in co-operation with the United States Geological Survey. The flow of Wakulla Spring at that time (February 12) measured at the bridge, three miles below the spring, was found to be 122,000 gallons per minute.

The United States Geological Survey (1913), "Water-Supply Paper 319; Geology and Ground Waters of Florida," page 422, describes Wakulla Spring as follows: "Discharge per minute, gallons, very large; emergence, boiling." One can feel a perceptible "lift" when drifting over the center of this spring in a small boat. The beautiful high hammock on the west side of the spring has been used for more than 50 years for the great annual Wakulla county picnic and political "get-together" meetings. Sidney Lanier, the author and traveler, wrote of Wakulla Spring, after spending many hours gazing into its mysterious depths: "The water is thrillingly transparent. * * * The distinct sensation is, that although the bottom is clearly seen, and although the objects in it are of their natural size, yet it and they are seen from a great distance. It is as if depth itself—that subtle abstraction—had been compressed into a crystal lymph, one inch of which would represent miles of ordinary depth. Everywhere the eye is met with a charming mosaic of brilliant hues. * * * Wakulla Spring is, beyond doubt, one of the most wonderful springs in the world. It is as utterly impossible to paint a picture of Wakulla Spring—with either brush or pen—as it is to portray the changing tints of the sunset or the glory of stars; it has to be seen."

The enormous flow of this wonderful fountain may some day be utilized commercially; it also offers opportunities for development as a resort. The carcass of a mastodon was exhumed from Wakulla Spring several years ago, and a portion of the jawbone can still be seen, far down in the basin. The spring is owned by Mrs. F. R. S. Phillips of Tallahassee. Advertisement

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mentioned.

Tex., Daingerfield—(Road).—\$80,000 Dist.
No. 1, Morris County, bonds are voted. Ad-
dress County Commrs.

Tex., Edgewood—(School).—Regarding re-
port that Edgewood School Dist. had voted
\$32,000 of bonds, a letter to the Manufac-
turers Record says that no bonds have been
voted.

Tex., Galveston—(Refunding).—\$36,000 of 5
per cent. bonds have been purchased by
Bolger, Mosser & Willaman, Chicago.

Tex., Granbury—(School).—April 27 elec-
tion is to be held to vote on \$8000 Cresson
School Dist., Hood County, bonds. Address
School Board.

Tex., Hereford—(Warrants).—\$30,000 of 6
per cent. Deaf Smith County road and
bridge warrants, dated April 10, 1918, and
maturing serially from 1919 to 1925 inclu-
sive, have been purchased by J. L. Arlitt,
Austin, Tex.

Tex., Hillsboro—(Road).—Election will prob-
ably be held in Hill County to vote on
bonds. Address County Commrs.

Tex., Hillsboro—(Sewerage).—Election is to
be held May 7 to vote on \$25,000 sanitary
sewerage-disposal-plant bonds. Address The
Mayor.

Tex., Paducah—(County).—\$100,000 of Pre-
dict No. 1, Cottle County, bonds are voted.
Address County Commrs.

Tex., Riverside—(School).—Election is to
be held to vote on \$12,000 of bonds Riverside
Independent School Dist. S. F. Houchens
is Secy. School Board.

Tex., Roby—(Road).—Commissioners Fish-
er County are planning to call an election
to vote on \$100,000 bonds of Dist. No. 1.

Tex., Rockport—(Highway).—The \$30,000 of
Jefferson Davis Memorial Highway bonds re-
cently voted by Arkansas County are 30-year
5½ per cents. Denomination \$1000. Dated
June 1, 1918. Jno. C. Herring is County Clk.

Tex., San Antonio—(School).—\$32,000 of
bonds are voted. Address School Board.

Tex., Sinton—(Road).—\$75,000 San Patricio
County bonds are voted. Address County
Commissioners.

Tex., Stamford—(Water, Sewer).—Election
is to be held May 11 to vote on \$40,000 water
and \$35,000 sewer 5 per cent. 40-year bonds.
R. L. Penick is Mayor.

Tex., Yoakum—(Hospital).—\$50,000 of per
cent. 20-40-year \$1000 denomination municipal
hospital bonds are voted. Date for opening
bids not yet decided. W. Lauder is City
Mgr.

W. Va., Charleston—(School).—Election is
to be held May 14 to vote on \$15,000 of 5 per
cent. 10-34-year \$1000 denomination bonds,
dated June 25, 1918. D. Dietrick is Pres.
Bd. of Education, Charleston Dist.

Bids close May 13, 1918.

\$18,000 5% Bonds

City of Quincy, Florida, offers for sale to
the highest and best bidder for cash, serial
bonds of said city in the sum of eighteen
thousand dollars, payable May 1, A. D. 1938,
bearing interest at rate of 5% per annum,
said interest payable semi-annually on the
first day of May and the first day of Novem-
ber of each year; bonds to be in the denomi-
nation of \$500, two of which, to be deter-
mined by the City Council of said city by
lot, shall be retired on the 15th day of May
of each and every year after the year A. D.
1918.

Sealed bids for the purchase of said bonds
will be received at the office of City Clerk of
the City of Quincy, Florida, until 11 o'clock
A. M. May 13, 1918, and each bid must be ac-
companied by a certified check for 30 per
cent. of the par value of the bonds bid for,
as evidence of good faith of the bidder, and
to pay all damages the said City of Quincy
may sustain on account of the non-compli-
ance of the bidder with the terms of his said
bid. The City of Quincy reserves the right
to reject any and all bids, and no bid will
be accepted for less than the par value of
said bonds.

CITY OF QUINCY.

By W. E. SHEFFER,

President City Council.

J. P. SMITH,

City Clerk.

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DELAWARE CHARTERS. Stock Without Par Value. Directors Need Not Be Stockholders. Other important amendments (March 20, 1917). Write for new DIGEST (4th ed.) CORPORATION COMPANY OF DELAWARE Equitable Building, Wilmington, Delaware.

PATENT ATTORNEYS

PATENT YOUR IDEAS.—\$9000 offered for certain inventions; book, "How to Obtain a Patent," and "What to Invent," sent free upon request; send rough sketch for free report as to patentability. We advertise your patent for sale at our expense. Chandler & Chandler, Patent Attorneys, 978 F St., Washington, D. C.

PATENTS.—Write for how to obtain a patent, list of patent buyers, and inventions wanted. \$1,000,000 in prizes offered for inventions. Send sketch for free opinion as to patentability. Our four books sent free upon request. Patents advertised free. We assist inventors to sell their inventions. Victor J. Evans Co., Patent Attorneys, 713 Ninth St., Washington, D. C.

POSTAL will bring free booklet telling all about patents and their cost. Shepherd & Campbell, Patent and Trade-Mark Attorneys, 732 8th St., Washington, D. C.

PATENTS AND TRADEMARKS Procured by a former Examining OFFICIAL of the U. S. Patent Office. **NORMAN T. WHITAKER.** Attorney-at-Law, Mechanical Engineer, 180 Whitaker Bldg., Washington, D. C. Inquiries Invited.

PATENTS THAT PROTECT AND PAY. Advice and books free. Highest references. Best results. Promptness assured. Trade-Marks registered. **Watson E. Coleman, Patent Lawyer,** 424 F St., Washington, D. C.

PATENTS FOR SALE

FOR SALE.—Patent 1,041,962, automatic mail-bag catcher and deliverer. Write for description. **Walter A. Clark,** 245 Hemingway Ave., East Haven, Connecticut.

VACUUM DRYING

EXPERIMENTAL work in vacuum drying. Why not try it for your products? Write for information. **Frederick J. Maywald, Consulting Chemist,** 89 Pine St., New York.

LOCATION WANTED

WANTED.—Factory site along railroad for manufacturing boilers, tanks and smokestacks. Correspondence solicited from chambers of commerce. Address No. 5090, care Manufacturers Record, Balto., Md.

FACTORY SITES

BALTIMORE FACTORY AND TERMINAL SITES.—Statement of Asa G. Candler, President The Coca-Cola Co.: "Investigation convinced us that Baltimore is not only the commercial metropolis for Southern trade, but that it affords shipping opportunities both by water and rail for domestic and foreign traffic superior to any of the great cities in any section of the United States." Locate in Baltimore and derive these advantages. We can provide accommodations to meet your requirements.

"OUR MOTTO" **FACTORY AND TERMINAL SITES IN BALTIMORE** **Wm. B. Martien & Co.** Ninth Floor, Lexington St. Bldg., Balto., Md.

FACTORY SITES

VIRGINIA.—50 to 75 acres water-front property, on Belt Line and Virginian railroads; 1 mile from Norfolk Navy Yard; 1 mile from city; on trolley line and boulevard. Address **R. A. Woods, Room 302, 3 Southern Produce Bldg., Norfolk, Va.**

INDUSTRIAL PLANTS FOR SALE

CLEANING PLANT

FOR SALE.—Incorporated cleaning plant in best cleaning district in Pa. Owners have other business. Will sell for spring season. Adv. will appear but once. Address No. 5068, care Manufacturers Record, Balto., Md.

WOODWORKING PLANT

FOR SALE.—TO SETTLE AN ESTATE.—Sash, door and blind manufacturing plant, with planing mill and lumber yard, at Sayre, Pa. A fine location for manufacturing purposes. Property located on the L. V. R. R. Switch. Accessible to Erie and D. & W. lines. For particulars write **W. K. Hart, Executor, Sayre, Pa.**

THE THIEF RIVER FALLS Manufacturing Company's plant, consisting of four lots joining Great Northern right of way. Shop 2-story ironclad building. Complete machinery. For sale through the undersigned. **Ole C. Morben, Receiver, Thief River Falls, Minn.**

ROTARY VENEER PLANT

FOR SALE.—Rotary veneer plant; 2 years' supply choice timber; plenty available. Long-established trade in non-embargoed territory. Labor plentiful. Address No. 5095, care Manufacturers Record, Balto., Md.

PLANING MILL AND LUMBER YARD

FOR SALE.—Large planing mill and retail lumber yard, on railroad, complete machinery, and doing \$225,000 annual business. Good, responsible customers. Owner wishes to retire on account of ill-health. P. O. Box 596, Buffalo, N. Y.

MANUFACTURING PLANT

MANUFACTURING PLANT.—Substantial brick buildings, ideally located. Approximately 45,000 square feet floor space. Private switch. Will sacrifice for quick sale. The Clifton Pratt Co., Cincinnati, Ohio.

PLUMBING AND SHEET METAL SHOP

FOR SALE.—Plumbing and sheet metal shop, well equipped. Offered more work than could do all winter. Great sacrifice for quick sale. Address Box 813, Laurel, Miss.

OIL MILL

THREE-PRESS, 48-box oil mill and 1 set Bushnell rolls and 1 heater at a sacrifice if taken at once. Ill-health cause of selling. Box 173, Gainesville, Ga.

AGENCIES WANTED

A SOUTHERN REPRESENTATIVE of a large and well-known make of sawmill machinery wants the agency for both portable engines and boilers, and oil and gas engines, 5 to 50 H. P. Address No. 5098, care Manufacturers Record, Balto., Md.

WANTED.—Well advertised lines of heavy hardware to carry to the jobbing trade in Southern territory. Can furnish best of reference. Address No. 5057, care of Manufacturers Record, Baltimore, Md.

SITUATIONS WANTED

SALES ENGINEER.—Member American Society Refrigerating Engineers, thoroughly familiar with Corliss engines, power plants, refrigerating plants, oil engines. A man with unbounded energy and enthusiasm, splendid health and vigor, now holding responsible position, desires to make a change. Can handle both men and machinery to get results. Willing to go anywhere. Would prefer connection, if possible, where services would be of some value, directly or indirectly, to our country in this time of trouble. Give full information and name time and place for personal conference in first letter. Address No. 5096, care Manufacturers Record, Balto., Md.

COMPETENT YOUNG BUSINESS MAN, over draft age, with several years' business and legal experience in responsible capacity, in up-to-date Western city, would like to secure location with Eastern or Southern firm offering good opportunity for advancement. Married, good health, good business and personal habits, executive experience and ability, with a special aptitude for thoroughness. Bank and other references. Address or wire **A. S. Zemp, 4302 Burke St., Seattle, Wn.**

OWING to Government's abolition of railroad offices, two general agents, with 20 years' experience soliciting in Pittsburgh territory, desire to represent reliable manufacturers. References guaranteed. Address Agents, 1017 Bessemer Bldg., Pittsburgh, Pa.

EXPERIENCED CONCRETE CONSTRUCTION MAN desires position with company building CONCRETE SHIPS. Address Contractor, P. O. Box 585, Shreveport, La.

MEN WANTED

MANUFACTURERS' AGENT wanted to sell a line of high-grade specialties for a concern of thirty years' reputation. Liberal commission basis. The Monitor Oil Company, Cleveland, Ohio.

WANTED.—Party with practical experience in manufacturing barium hydrate. Address No. 5097, care Manufacturers Record, Balto., Md.

MEN WANTED

IF ACTUALLY QUALIFIED for salary between \$2500 and \$25,000, communicate with undersigned, who will negotiate strictly confidential preliminaries for such positions: executive, administrative, technical, professional; all lines. Not an employment agency; undersigned acts in direct confidential capacity, not jeopardizing present connections. Established 1910. Send name and address only for explanatory details. **R. W. Bixby, 1364-66 Niagara Street, Buffalo, N. Y.**

A LARGE CHEMICAL PLANT in the South can use a number of bright young college or technical men who have had engineering or mechanical experience. Men who have worked in sugar refineries, cement, refrigerating, gas, chemical, power or electric plants can be used. Good, all-around mechanics are also needed, plumbers, pipe and steam fitters, sheet metal workers, as well as men who have or can operate furnaces, ovens, kilns, furnace conveyors, crushers, mining or milling machinery. The pay will be good, working conditions unexcelled and chances for promotion excellent. Address No. 5085, care Manufacturers Record.

SEVERAL FOREMEN.—Industrial plant in South wants men who have had experience in chemical plants, cement mills, refrigerating plants, or with mining and milling machinery. Salary while under instruction, railroad fares to and from their home, and employment at good salary is offered to those who qualify. Give full particulars as to birth, education and years, and nature of experience. Address No. 5084, care Manufacturers Record, Balto., Md.

WANTED.—An experienced corrugated culvert traveling salesman. The Canton Culvert & Silt Co., Canton, Ohio.

BOATS FOR SALE

SCHOONER FOR SALE.—98 ft. keel, 22 ft. beam, 5½ ft. draught. Also one 12x14 Sutton marine engine. **W. P. Kavanaugh, Bay City, Mich.**

MACHINERY AND SUPPLIES

250 H. P. Allis-Chalmers cr. compound non-condensing engine, direct connected to 200 K. W. Bullock D. C. generator, 240 volts, 125 R. P. M. Complete with switchboard. In good running order. **A. Courchesne, El Paso, Tex.**

FOR SALE.—One Withrow Blowing Engine, 36x84x60, complete, in good condition, capable of blast pressure of from 1200 to 1500 pounds. **Dayton Coal, Iron & Railway Co., Dayton, Tenn.**

MACHINERY AND SUPPLIES

FOR SALE.—12x12x16 Hand compressor, 60 H. P. boiler, power guy derrick, No. 2 Gates crusher, pumps, channel bar, derrick fittings, surfacing machines, plug drillers, blueprint frames. **T. M. Byrd, Salisbury, N. C.**

FOR SALE.—One Kent mill, suitable for grinding agricultural limestone, etc. Address No. 5081, care Manufacturers Record, Balto., Md.

FOR SALE.—Engine and car at Chesapeake Beach, Md. Engine 16x24 cylinder, 56-inch driving wheel. Address **L. W. Andrew, Montgomery, Ala. P. O. Box 424.**

FOR SALE.—1200 feet of 3-inch black pipe, used; 1500 of 4-inch black pipe, used; 500 feet of 5-inch black pipe, used. Four-inch practically new. Immediate delivery. **Cohoon Bros., Orlando, Fla.**

FOR SALE.—New Williams Universal type No. 9 size Hammer mill, with ½" and ¾" metal cage, equipped with flywheel fan and No. 30 Cyclone collector complete. Price \$500 f. o. b. Spruce Pine, N. C. **English Mica Co., Williamsport, Pa.**

FOR SALE.—Some modern canning machinery, also two Belknap Pat. orchard wagons, also 1 sawmill, complete, 10 M. ft. daily cap. **L. S. Colyar, 427 James Bldg., Chattanooga, Tenn.**

FOR SALE.—Chambers brick machine with automatic cut-off and pug machine, 15-foot fan and heating coils for drying. **T. L. Montague, 122 W. 8th St., Chattanooga, Tenn.**

FOR SALE.—One new 800-gallon steel oil tank. **O. N. Richardson Milling Co., Rome, Ga.**

FOR SALE.—45 H. P. International Tractor, also 2 Trailers; all practically new; cheap. Address Box 54, Edenton, N. C.

FOR SALE.—A Sturtevant No. 60 rotary crusher for coal, ore, etc. Less than 6 months' use. Guaranteed first-class condition. **Barrow-Agee Laboratories, Box 1056, Memphis, Tenn.**

FOR SALE.—83½-ft. 26" 10-ply canvas belt; big bargain. 65 H. P. boiler and 32-inch steel smokestack, 65 ft. long. Address No. 5070, care Manufacturers Record, Balto., Md.

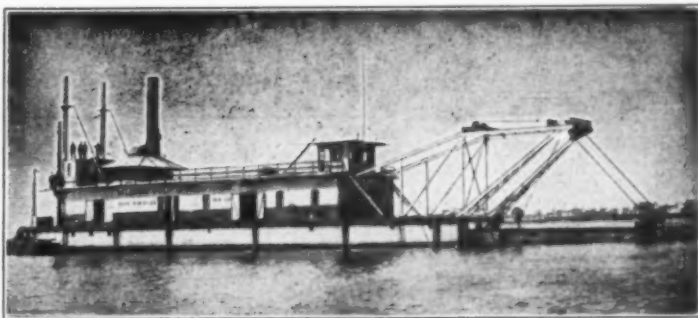
MACHINERY and SUPPLIES WANTED

ELECTRIC FURNACE WANTED.—Second-hand or new, if for immediate delivery, suitable for making ferro alloys. Send complete specifications, detailed statement of condition and price. Address No. 5073, care Manufacturers Record, Balto., Md.

Atlantic, Gulf and Pacific Co.

NEW YORK MANILA, P. I. MOBILE, ALA.

Contractors to the Federal Government



Dredging and Filling, Land Reclamation, Canals and Port Works

River and Harbor Improvements, Deep Waterways and Ship Channels

We are especially equipped to execute all kinds of dredging, reclamation, and port works in Southern waters.

Correspondence invited from Southern officials and corporate and private interests everywhere.

Largest Plant

Longest Experience

PROPOSALS

BOND ISSUES

BUILDINGS

PAVING

GOOD ROADS

More Southern Proposal Advertising Is Printed In The Manufacturers Record Than In Any Other Paper

Bids close May 16, 1918.

TREASURY DEPARTMENT, Supervising Architect's Office, Washington, D. C., April 18, 1918. Proposals will be opened in this office at 3 P. M. May 16, 1918, for the construction complete of twelve additional buildings and the remodeling of the attendants' quarters at the United States Quarantine Station, Craney Island, Cape Charles, Va. Drawings and specifications may be obtained from the custodian at the station, or at this office, in the discretion of the Supervising Architect. JAS. A. WETMORE, Acting Supervising Architect.

Bids close May 6, 1918.

\$4500 School Bonds

Board of Supervisors of Clarke County, Miss., will sell \$4500 of Carmichael Consolidated School Bonds to the highest bidder on the first Monday in May, A. D. 1918.
W. H. FOSTER, Clerk,
Quitman, Miss.

Bids close May 11, 1918.

\$35,000 Street Improvement Bonds

City of Lake Alfred, Florida, offers \$35,000 street-improvement bonds to let on May the 11th, bids closing at 12 o'clock M.
C. F. JESTER, City Clerk.

\$50,000 5% Bonds

Watauga County, North Carolina, offers Fifty Thousand (\$50,000) Dollars Good Roads Bonds, 5 per cent., semi-annual interest, serial issue, five to ten years. Sealed bids May 6, 1918, at 2 o'clock P. M., and continued from day to day until all bids. Certified check, vouchered for by local bank, 1 per cent. of bid required.

For information write W. R. Gragg, Clerk of the Board of Commissioners, at Boone, N. C.

W. R. GRAGG,
Clerk to the Board of County Commissioners.

Bids close May 7, 1918.

\$40,000 6% Bonds

The Board of Commissioners of Wake County, State of North Carolina, will, on the 7th day of May, 1918, at 12 o'clock M., at the office of said Commissioners in Wake County Court House, Raleigh, N. C., open bids for the purchase of Forty Thousand (\$40,000) Dollars in thirty-year 6 per cent. coupon bonds, the said bonds to be known as the Garner Road District Bonds, issued for the purpose of constructing, altering or improving a road traversing said road district, said bonds to be issued by the County Commissioners of Wake County under the provisions of Section 48, Chapter 284, North Carolina Public Laws of 1917. All bids must be accompanied by certified check, properly vouchered for by a Raleigh bank, for not less than 2 per cent. of the amount of the issue.

By order of the Board of Commissioners of Wake County, this 3d day of April, 1918.
ARCH. J. WOOD,
Clerk to Board of County Commissioners.
J. W. BUNN,
County Attorney.

\$55,000 6% Bonds

Notice is hereby given that the Board of Supervisors of Clay County, Mississippi, will offer for sale on the 15th day of March, 1918, at the Court House in West Point, \$55,000 District No. 2 Road Bonds, bearing 6 per cent., payable semi-annually.

Said Board of Supervisors will offer for sale on the 1st day of April, 1918, at the Court House in West Point, \$40,000 County Bonds, bearing 6 per cent., payable semi-annually.

All bids to be filed with the Clerk of said Board by 2 o'clock P. M. of said dates.
A certified check for \$500 must accompany each bid.

L. J. HOWARD, Clerk.

Bids close May 15, 1918.

Sewers

Bids will be received at the office of the Board of Improvement Sewer District No. 2 of Fort Smith, Arkansas, on or before May 15, 1918, for the construction of 3300 feet of Sewer Laterals, 15 Manholes and 5 Lamp holes in Sewer District No. 2. Plans and specifications can be had at office of W. H. Evans, City Engineer. Certified check for Five Hundred (\$500) Dollars to accompany each bid.

By order of the Board.

W. F. BLOCKER,
Secretary.

Bids close May 15, 1918.

Water-Works System

The Town Council of Brooksville, Florida, invites bids for the construction of a municipal water-works system in said town. Bids will be opened at 8 o'clock P. M. on May 15, 1918, at the Town Hall. The Town Council reserves the right to reject any or all bids. Full details may be had by application to W. M. Russell, Town Clerk, Brooksville, Fla.

Bids close May 7, 1918.

Bridge

Lake Worth, Fla.

Sealed bids will be received by the Board of County Commissioners of Palm Beach County, Florida, at the Clerk's office at West Palm Beach, Florida, up to 12 o'clock noon Tuesday, May 7, 1918, for the construction complete of a bridge across Lake Worth at Lake Worth, Fla., said bridge to consist of a 150-ft. steel swing draw, or a Scherzer rolling-lift steel span, with clear opening of 60 ft. All according to plans and specifications for said work on file in the office of the County Engineer, West Palm Beach, Florida.

Each bid must be accompanied with a certified check, payable to the Board of County Commissioners, in an amount equal to 2 per cent. of amount of bid as a guarantee that the bidder will, if awarded the contract, enter into contract promptly for said work and complete the same within the time limit named in his contract.

Each bidder will state when he will be ready to commence said work and the time required by him to complete the same.

Plans and specifications will be forwarded to any address on receipt of request made to R. F. Goodman, County Engineer, accompanied by remittance of \$15, which remittance is to be refunded on the return of said plans and specifications to the Board of County Commissioners.

The Board reserves the right to reject any or all bids.

By order of the Board of County Commissioners.

L. TREVETTE LOCKWOOD,
Chairman.
GEO. O. BUTLER,
Clerk.

(Seal County Commissioners.)

Bids close May 14, 1918.

Bridge Construction

Notice is hereby given that the cities of Bradenton and Palmetto will receive sealed bids until 2 o'clock P. M. May 14, 1918, for the construction of a bridge across Manatee River between said cities from the foot of Florida avenue in the City of Bradenton where said Florida avenue reaches the south bank of said river to the foot of Lemon avenue in the City of Palmetto where said Lemon avenue reaches the north bank of said river, according to plans and specifications on file in City Clerk's office of each of said cities.

The contractor will be required to give a good and sufficient bond, to be approved by each of said cities, for the completion of said bridge, which shall be constructed under the supervision and approval of an engineer of said cities. Bid may be for the whole or any part of said bridge, and each bid must be accompanied by a certified check made payable to the City Clerk of the City of Bradenton in the sum of 2 per cent. of amount of bid as evidence of good faith and a guarantee that if awarded contract said bidder will enter into and give a good and sufficient bond in some standard surety company, else forfeit the money represented by said check.

Said cities reserve the right to reject any and all bids or any part of any bid.

HARRY WADHAM,
Commissioner of Public Works,
City of Bradenton.
L. G. WINGATE,
Commissioner of Public Works,
City of Palmetto.

Bids close May 6, 1918.

Sand Clay Highway

Kosciusko, Miss.

Bids will be received by the Highway Commissioners of Road District No. 1 of Supervisors' District No. 2, Attala County, Miss., until 11 A. M. May 6, 1918, at Chancery Clerk's office, for the construction of approximately twenty (20) miles of sand-clay highway. Each bid must be accompanied by certified check for \$1000. Bids will also be received for furnishing all necessary culvert pipe to be used in construction of highways. The right to reject any and all bids is reserved.

M. D. SMITH, Engineer.

J. R. HAND,
Pres. Board Supervisors.
B. W. JORDON,
Chancery Clerk.

Highway Commission:
C. C. FANCHER, Chairman;
CLAY TAYLOR, Secy.;
JNO. CROSBY.

Bids close April 30, 1918.

Highway Improvement

Notice is hereby given that sealed proposals for the construction of approximately ten miles of highway improvement in Cherokee County, Limestone and Draytonville Townships, will be received at the office of the Cherokee Highway Commission at Gaffney, S. C., until 11 o'clock A. M. April 30, 1918, and then publicly opened. The character of the proposed improvement is unclassified excavation, general drainage, sand-clay, top-soil and clay-gravel surfacing.

For further information apply to the undersigned. Specifications, form of proposal and contract will be mailed to contractors interested upon application with check for \$2 enclosed.

W. E. PEELER, Secretary.
N. C. HUGHES, JR., Engineer.

Bids close May 6, 1918.

Highway Construction

OFFICE OF THE VIRGINIA STATE HIGHWAY COMMISSION.

Richmond, Va., April 17, 1918.

Sealed proposals will be received by the Virginia State Highway Commissioner at the office of the County Clerk, Fairfax, Virginia, until two (2) o'clock P. M. May 6, 1918, for the construction of not more than five (5) or less than three (3) miles of the State Road, beginning at Fairfax and extending towards Chantilly, and at the same time and place will be publicly opened.

Performance of contract shall begin within ten (10) days after execution of contract, and shall be completed in 250 working days. Bidders must submit proposals upon forms provided by the Virginia State Highway Commissioner. All bids shall be accompanied by a certified check for five hundred (\$500) dollars.

The right is reserved to reject any or all bids.

Plans and specifications can be obtained from the Virginia State Highway Commissioner, Richmond, Virginia, by depositing five (\$5) dollars, one-half of which will be refunded when plans and specifications are returned in good condition.

Plans may be seen at the office of the County Clerk, Fairfax, Virginia, or at the office of the State Highway Commissioner, Richmond, Virginia.

G. P. COLEMAN,
State Highway Commissioner.

Bids close May 7, 1918.

Highway Construction

OFFICE OF THE VIRGINIA STATE HIGHWAY COMMISSION.

Richmond, Va., April 17, 1918.

Sealed proposals will be received by the Virginia State Highway Commissioner at the office of F. A. Davis, U. S. Highway Engineer, County Courthouse, Charlottesville, Va., until 12 noon May 7, 1918, for the construction of 3.16 miles of the State Highway System, Route 9, between Mechums River and Ivy, and at that time and place publicly opened.

Performance of the contract is to begin within ten days after execution of contract and to be completed in 150 working days.

Alternate bids will be received, the State Highway Commissioner agreeing to furnish, at the rate of 15c. per hour, not less than 30,000 nor more than 50,000 convict hours; convicts to be worked under the laws of the State of Virginia and such rules and regulations as may be prescribed by the State Highway Commissioner.

Bidders must submit proposals in forms provided by the Commission.

Each bid must be accompanied by a certified check for \$500.

The right is reserved to reject any or all bids.

Plans and specifications can be obtained from the State Highway Commissioner, Richmond, Va., by depositing \$5, one-half of which will be refunded when plans are returned in good shape.

Plans may be seen at the office of the State Highway Commissioner, Richmond, Va., or at the office of F. A. Davis, U. S. Highway Engineer, Charlottesville, Va.

G. P. COLEMAN,
State Highway Commissioner.

Bids close April 30, 1918.

Highway Construction

Sealed bids will be received up until 2 o'clock Tuesday, April 30, at the Chancery Clerk's office at Starkville, Mississippi, for the construction of highways in Supervisors' District No. Two of Oktibbeha County according to plans and specifications on file in the office of Chancery Clerk of said County. Each bid to be accompanied by certified check, made payable to President of Board of Supervisors of said County, in amount of \$1000, said check to be held as evidence of good faith of bid submitted and to be returned immediately in case of rejection of bid. \$40,000 available. Plans and specifications may be obtained from E. C. Thomas, District Engineer.

(Signed) J. R. LONG,
Clerk.

Bids close May 15, 1918.

Church

Bids for the labor and materials for the erection of a two-story church building for the Methodist Episcopal Church South at Hartford, Alabama, will be received by J. C. Holman, the chairman of the building committee, until 2.30 P. M. May 15, 1918.

Reputable contractors will be furnished plans and specifications upon deposit with the chairman of the building committee of ten dollars (\$10) as a guarantee that they will be returned in good order on or before the above date, said deposit to be returned upon the return of the plans and specifications.

Satisfactory bond in half the amount of the contract price will be required of the successful bidder.

The committee reserves the right to reject any or all bids or to award the contract to other than the lowest bidder.

J. C. HOLMAN,
Chairman Building Committee.

Bids close May 13.

Drainage Work

Greenville, Miss.

Bids for the clearing of about 700 acres in natural channels, according to the plans and specifications on file, will be received at Greenville, Miss., on Monday, May 13, 1918, at 10 A. M. by the Board of Commissioners of the Black Bayou Drainage District, Washington County, Mississippi.

Further information will be furnished upon request.

BLACK BAYOU DRAINAGE DISTRICT.
By O. C. KULICKA,
Secretary.

MORGAN ENGINEERING CO.,
Engineers, Memphis, Tenn.

Bids close May 9, 1918.

Drainage Contract

The undersigned will receive sealed bids until noon May 9, 1918, for contract to clear right-of-way 100 feet wide and dig drainage canal 7.1 miles long; also, for clearing right-of-way for lateral, same width and 800 feet long, and excavating same. A total of about 124,500 cubic yards of earth to be removed. Sizes of both main canal and lateral: Top width, 16 feet; average depth, 7 feet; bottom width, 9 feet. All in Madison County, Tennessee.

Maps and profiles can be seen and further data obtained on application. Address A. W. Stovall, Chairman, Jackson, Tennessee.

Bids close May 9, 1918.

Levees and Ditches

Blytheville, Ark.

Bids will be received by the Board of Directors of Drainage District No. 17, Mississippi County, Arkansas, on May 9, 1918, at 1 P. M.

The work consists of both levees and ditches, and is divided into a number of contracts. Total estimated cost of earthwork approximately \$1,350,000. A certified check or proposal bond for \$1000 will be required for each contract for which bid is submitted, or a certified check or bond for \$5000 for bidding on any or all contracts.

Maps, profiles and specifications will be ready for mailing April 15, and can be had from Pride & Fairley, Engineers, Blytheville, Arkansas, upon receipt of \$2.50.

J. L. RUSSELL,
Secretary.

Bids close May 7, 1918.

Physics-Engineering Building

Sealed proposals will be received at the University of North Carolina by Edward K. Graham, President, Chapel Hill, N. C., until two o'clock P. M. on the 7th day of May, 1918, for the construction of the Physics-Engineering Building, according to the drawings and specifications prepared by Charles C. Hook, Architect, Charlotte, N. C.

The right is reserved to reject any and all proposals. A certified check and satisfactory surety bond will be required. Certified check in the sum of one thousand dollars as a guarantee that if awarded the contract the successful contractor will deliver to the President of the University a surety bond for three-fourths the amount of the contract within ten days from date of award or forfeit the check.

Drawings and specifications are on file at the office of the President of the University, Chapel Hill, N. C., and at the office of the Architect, Charles C. Hook, Charlotte, N. C.

Proposals must be approved by the State Building Commission before an award of contract can be made.

Contractors must deposit with the architect a check in the sum of fifteen dollars as a guarantee that if drawings and specifications are delivered, that a proposal will be submitted, or forfeit check. All checks to be returned to contractors submitting proposals.

UNIVERSITY OF NORTH CAROLINA.

Bids close May 7, 1918.

Enlargement of Filter Plant

Fort Worth, Tex.

Sealed proposals will be received by the Mayor and Board of Commissioners of the City of Fort Worth, Tex., until 9 o'clock Tuesday, May 7, 1918, for the construction of preliminary treatment works at the water filtration plant in Fort Worth, Tex.

The work covers the construction of preliminary treatment works for a rapid sand filtration plant having a capacity of 10,000,000 gallons per 24 hours, and consists mainly of the construction of a chemical house, aeration basin, mixing chamber and two sedimentation basins, each having a capacity of 1,250,000 gallons; and of the laying of certain new pipes, sewers, conduits, etc.

Plans and specifications may be obtained from F. J. Von Zuben, City Engineer, City Hall, Fort Worth, Tex., and also from the office of John H. Gregory, Consulting and Designing Engineer, 170 Broadway, New York City. A charge of \$25 will be made for each set of plans and specifications, which amount will be refunded upon the return of the plans and specifications in good condition.

Each bid must be accompanied by a certified check on a Fort Worth bank for \$6000; and the successful bidder will be required to furnish a surety company bond of \$25,000.

J. C. LOMB,
Commissioner of Water-Works.

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